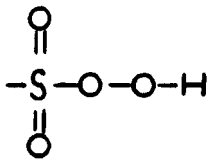
CLASS 562, ORGANIC COMPOUNDS -- PART OF THE CLASS 532-570 SERIES

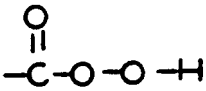
SUBCLASSES

1 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein H of -OH may be replaced by a Group IA or IIA light metal, or by substituted or unsubstituted ammonium:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing oxygen, sulfur nitrogen and group IA or IIA light metals.

2 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein H of -OH may be replaced by a Group IA or IIA light metal, or by substituted or unsubstituted ammonium:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing oxygen, nitrogen, and group IA or IIA light metals.

3 This subclass is indented under subclass 2. Products wherein the percarboxylic acid is mixed with a stabilizing or preserving agent, whose sole function is to prevent physical or chemical change.

4 This subclass is indented under subclass 2. Processes which involve the formation of the -C(=O)-O-O-H group, or the formation of a salt of this group.

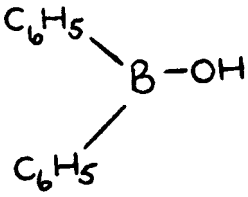
(1) Note. The formation of the salt is classified here regardless of whether the salt is made from the-C(=O)-O-O-H group, or if it is made by other means.

5 This subclass is indented under subclass 4. Processes wherein an aldehyde or a percarboxylic acid ester is used as a reactant.

6 This subclass is indented under subclass 4. Processes wherein a carboxylic acid or a carboxylic acid salt is used as a reactant.

7 This subclass is indented under subclass 1. Compounds under Class 532, ... in which boron is attached directly to -XH by nonionic bonding, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium) and H of -XH may be replaced by a Group IA or IIA light metal, or by substituted or unsubstituted ammonium.

(1) Note. An example of a compound provided for herein is:

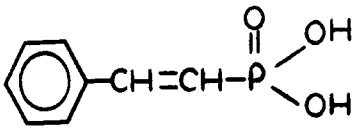


SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing, chalcogens, nitrogen, and group IA or IIA light metals.

8 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein -XH is bonded directly to phosphorus by nonionic bonding; the X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium) and -H of -XH may be replaced by a Group IA or IIA light metal or

by substituted or unsubstituted ammonium (i.e., phosphorus acid or salt thereof).

(1) Note. An example of a compound provided for herein is:

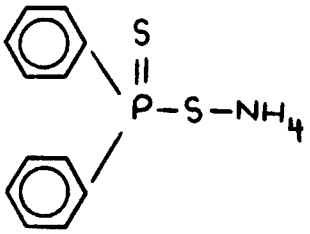


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408, and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, chalcogen, phosphorus, nitrogen, and group IA or IIA light metals.

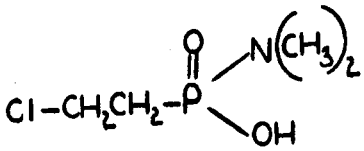
9 This subclass is indented under subclass 8. Compounds in which sulfur is attached directly to the phosphorus by nonionic bonding.

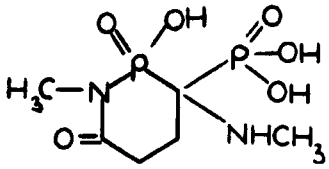
(1) Note. An example of a compound provided for herein is:



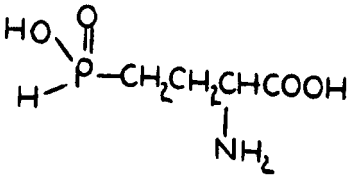
10 This subclass is indented under subclass 8. Compounds wherein nitrogen is attached directly to the phosphorus by nonionic bonding.

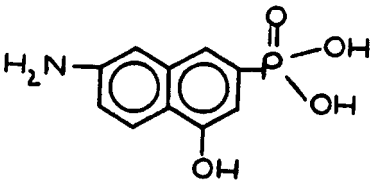
(1) Note. Examples of compounds provided for herein are:





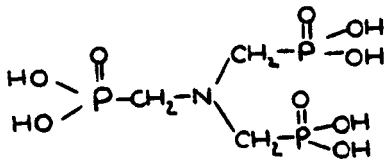
11 This subclass is indented under subclass 8. Compounds wherein nitrogen is attached indirectly to the phosphorus by nonionic bonding.





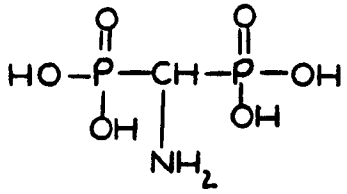
12 This subclass is indented under subclass 11. Compounds in which at least two atoms of phosphorus are attached indirectly to each other by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



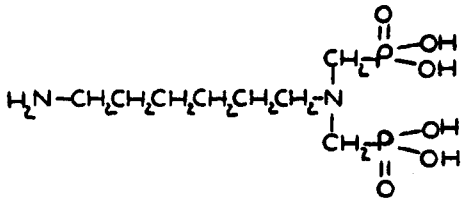
13 This subclass is indented under subclass 12. Compounds in which at least two phosphorus atoms are bonded directly to the same carbon.

(1) Note. An example of a compound provided for herein is:



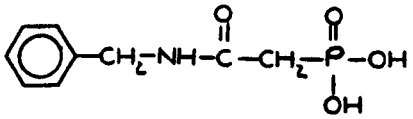
14 This subclass is indented under subclass 12. Compounds wherein additional nitrogen is attached indirectly to the phosphorus by non-ionic bonding.

(1) Note. An example of a compound provided for herein is:



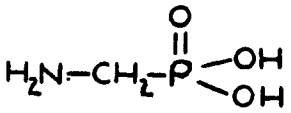
15 This subclass is indented under subclass 11. Compounds in which the nitrogen is bonded directly to a -C(=X)-group, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. An example of a compound provided for herein is:



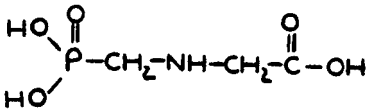
16 This subclass is indented under subclass 11. Compounds wherein the nitrogen and the phosphorus are bonded directly to the same carbon.

(1) Note. An example of a compound provided for herein is:



17 This subclass is indented under subclass 16. Compounds wherein the nitrogen is bonded directly to an additional acyclic carbon or acyclic carbon chain to which a -C(=X)X- group is also bonded directly, wherein the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium).

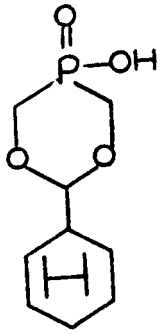
(1) Note. An example of a compound provided for herein is:



18 This subclass is indented under subclass 17. Processes whereby a compound which contains a nitrogen-heterocyclo is utilized in the preparation.

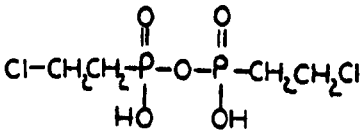
19 This subclass is indented under subclass 8. Compounds in which the phosphorus is a ring member.

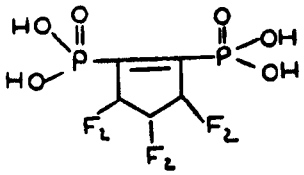
(1) Note. An example of a compound provided for herein is:



20 This subclass is indented under subclass 8. Compounds in which at least two phosphorus atoms are attached indirectly to each other by nonionic bonding.

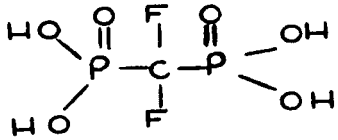
(1) Note. Examples of compounds provided for herein are:

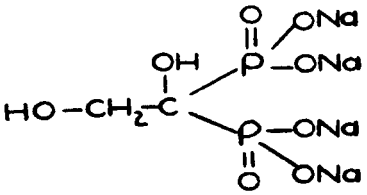




21 This subclass is indented under subclass 20. Compounds wherein the plural phosphorus atoms are bonded directly to the same carbon.

(1) Note. Examples of compounds provided for herein are:

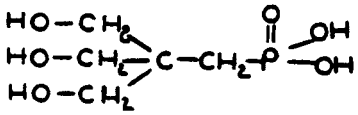


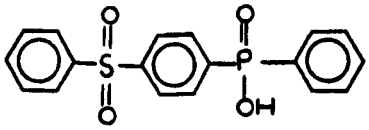


22 This subclass is indented under subclass 21. Processes for the preparation of compounds having plural phosphorus atoms bonded directly to the same carbon or for the treatment of such compounds.

23 This subclass is indented under subclass 8. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached indirectly to the phosphorus atom by nonionic bonding.

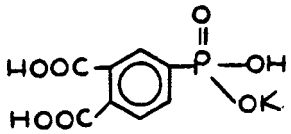
(1) Note. Examples of compounds provided for herein are:

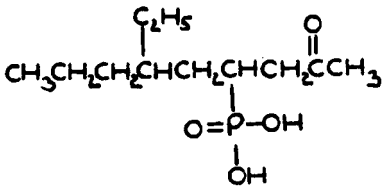




24 This subclass is indented under subclass 23. Compounds in which the chalcogen is in a -C(=X)- group.

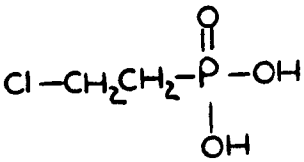
(1) Note. Examples of compounds provided for herein are:



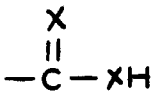


25 This subclass is indented under subclass 8. Compounds in which halogen is attached indirectly to the phosphorus atom by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



26 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium), at least one X is sulfur, and H of -XH may be replaced by a Group IA or IIA light metal or by substituted or unsubstituted ammonium:

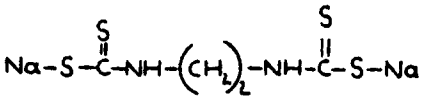


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408, and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen, nitrogen, and group IA or IIA light metals.

27 This subclass is indented under subclass 26. Compounds wherein the carbon of the -C(=X)XH group, or of its salt, is bonded directly to nitrogen.

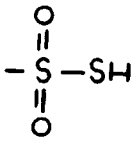
(1) Note. An example of a compound provided for herein is:



28 This subclass is indented under subclass 27. Processes wherein carbon disulfide is used.

(1) Note. Carbon disulfide is:

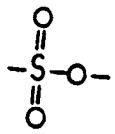
29 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein H of -SH may be replaced by a Group IA or IIA light metal, or by substituted or unsubstituted ammonium:



SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408, and 409 for the chemical destruction of organic hazardous or toxic waste containing sulfur, nitrogen, and group IA or IIA light metals.

30 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, sulfonate, wherein the single bonded oxygen is bonded directly to hydrogen, or to a Group IA or IIA light metal, or to substituted or unsubstituted ammonium:

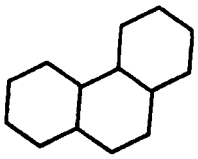


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405 through 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, chalcogen, nitrogen, phosphorus, and group IA or IIA light metals.

31 This subclass is indented under subclass 30. Compounds which contain the hydrophenanthrene ring system.

(1) Note. The hydrophenanthrene ring system is depicted by the following structure, in which at least one of the rings is not a benzene ring:



32 This subclass is indented under subclass 30. Processes wherein lignites, leonardites, coal, humic acids, bark or pitch is sulfonated to form a sulfonic acid or salt thereof, or the reaction products of such processes.

33 This subclass is indented under subclass 30. Compounds wherein the sulfur of the sulfonate group is bonded directly to carbon of petroleum.

(1) Note. Petroleum is considered as a naturally occurring mixture of gaseous, liquid and/or solid hydrocarbons.

(2) Note. In the case of distillable petroleum, a fraction taken over a certain boiling point range is regarded as within the scope of this subclass, if sulfonated.

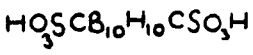
(3) Note. Specific sulfonated compounds, even if identified as having been derived from petroleum or petroleum fractions, are classified with the appropriate compound as provided for.

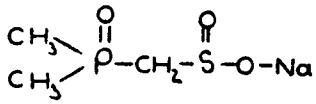
(4) Note. Some specific types of petroleum products which, if sulfonated, are classified herein are: rhigolene, petroleum ether, gasoline, naphtha, ligroine, benzine, kerosene, lubricating oils, paraffin oil and icthyol.

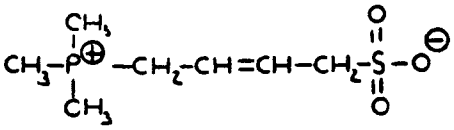
34 This subclass is indented under subclass 33. Products wherein the single bonded oxygen of a petroleum sulfonate group is bonded directly to organic nitrogen by ionic bonding.

35 This subclass is indented under subclass 30. Compounds wherein the sulfonate group is attached indirectly to boron or phosphorus by nonionic bonding.

(1) Note. Examples of compounds provided for herein are:

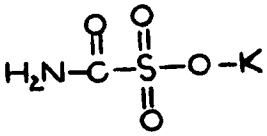


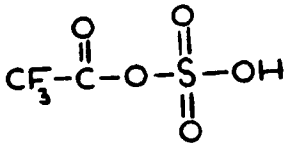




36 This subclass is indented under subclass 30. Compounds wherein the sulfur of the sulfonate group is attached directly to chalcogen (i.e., oxygen, sulfur, selenium or tellurium) or to -C(=X)-, wherein X is chalcogen, by nonionic bonding.

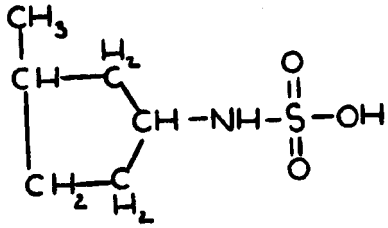
(1) Note. Examples of compounds provided for herein are:





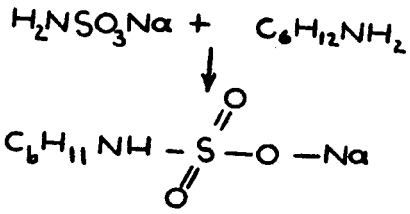
37 This subclass is indented under subclass 30. Compounds wherein the sulfur of the sulfonate group is attached directly to nitrogen by nonionic bonding.

(1) Note. An example of a compound provided for herein is:

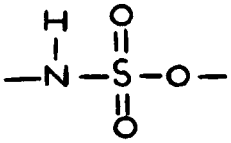


38 This subclass is indented under subclass 37. Processes wherein an inorganic sulfamic acid, or a salt of an inorganic sulfamic acid, is used.

(1) Note. An example of a process provided for herein is:

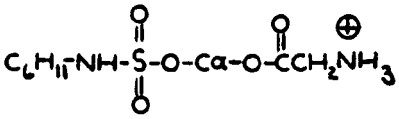


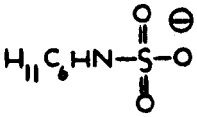
39 This subclass is indented under subclass 37. Processes which involve the formation of the following group, wherein substitution may be made for hydrogen only:



40 This subclass is indented under subclass 37. Compounds wherein the single bonded oxygen of the sulfonate group is bonded directly to organic nitrogen by ionic bonding.

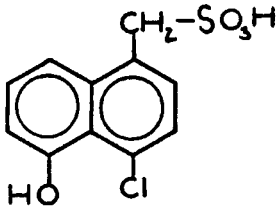
(1) Note. An example of a compound provided for herein is:





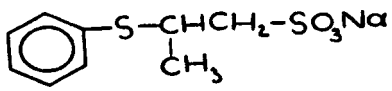
41 This subclass is indented under subclass 30. Compounds wherein the sulfonate group is attached indirectly to a benzene ring by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



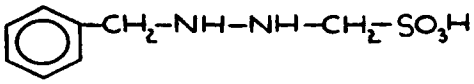
42 This subclass is indented under subclass 41. Compounds wherein the acyclic chain between the benzene ring and the sulfonate sulfur has a noncarbon atom as a chain member.

(1) Note. An example of a compound provided for herein is:



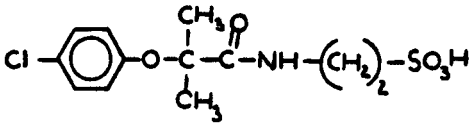
43 This subclass is indented under subclass 42. Compounds wherein the acyclic chain has nitrogen as a chain member.

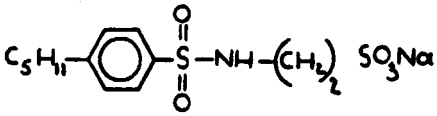
(1) Note. An example of a compound provided for herein is:



44 This subclass is indented under subclass 43. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) or -C(=X)-, wherein X is chalcogen, is also a member of the acyclic chain.

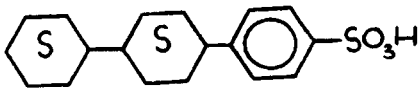
(1) Note. Examples of compounds provided for herein are:





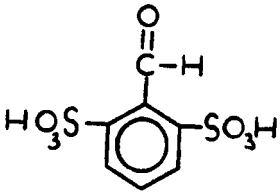
45 This subclass is indented under subclass 30. Compounds wherein the sulfonate sulfur is bonded directly to a benzene ring.

(1) Note. An example of a compound provided for herein is:



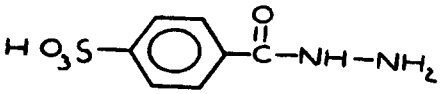
46 This subclass is indented under subclass 45. Compounds wherein the sulfonate group is attached indirectly by nonionic bonding to -C(=X)-, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. An example of compounds provided for herein is:



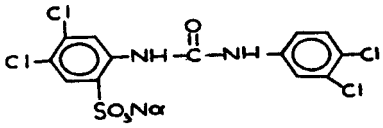
47 This subclass is indented under subclass 46. Compounds wherein the -C(=X)- group is bonded directly to nitrogen or to chalcogen.

(1) Note. An example of a compound provided for herein is:



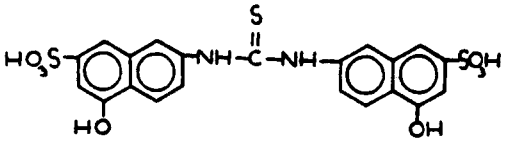
48 This subclass is indented under subclass 47. Compounds wherein each nitrogen of a -NH-C(=X)-NH- group, wherein X is chalcogen and substitution may be made for hydrogen only, is bonded directly to a benzene ring.

(1) Note. An example of a compound provided for herein is:



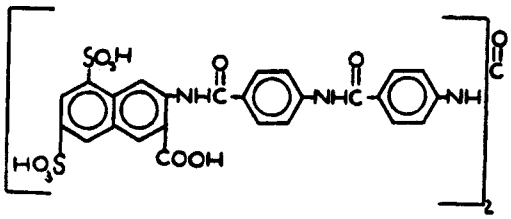
49 This subclass is indented under subclass 48. Compounds wherein the -NH-C(=X)-NH- group is bonded directly to at least one benzene ring that is part of a naphthalene ring system.

(1) Note. An example of a compound provided for herein is:

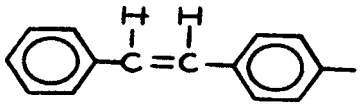


50 This subclass is indented under subclass 48. Compounds wherein the -NH-C(=X)-NH- is attached indirectly to plural naphthalene ring systems by nonionic bonding.

(1) Note. An example of a compound provided for herein is:

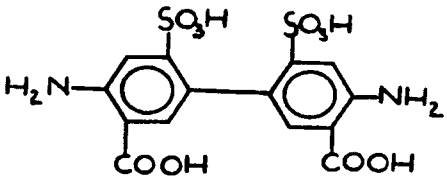


51 This subclass is indented under subclass 47. Compounds which contain the following group, wherein substitution may be made for hydrogen only:



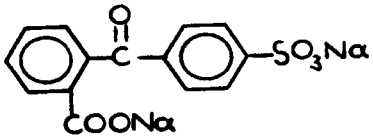
52 This subclass is indented under subclass 47. Compounds wherein the sulfonate group is attached indirectly to plural -C(=X)- groups by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



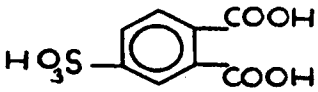
53 This subclass is indented under subclass 52. Compounds wherein a -C(=X)- group is bonded directly to two carbon atoms.

(1) Note. An example of a compound provided for herein is:



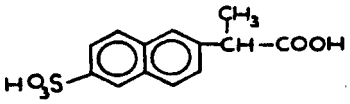
54 This subclass is indented under subclass 52. Compounds wherein a benzene ring is bonded directly to more than one -C(=X)- group.

(1) Note. An example of a compound provided for herein is:



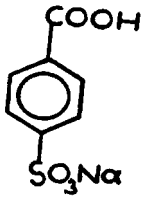
55 This subclass is indented under subclass 47. Compounds wherein the -C(=X)- group is bonded directly to an acyclic carbon.

(1) Note. An example of a compound provided for herein is:



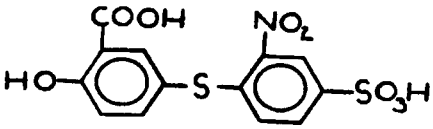
56 This subclass is indented under subclass 47. Compounds wherein the -C(=X)- group is bonded directly to chalcogen in a -C(=X)X- group, in which the X's may be the same or diverse chalcogens.

(1) Note. An example of a compound provided for herein is:



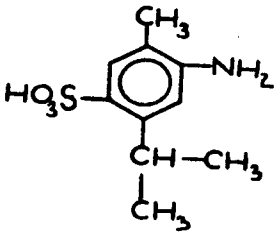
57 This subclass is indented under subclass 56. Compounds wherein the sulfonate group is attached indirectly to nitrogen by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



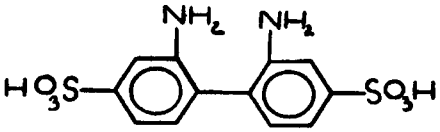
58 This subclass is indented under subclass 45. Compounds wherein the sulfonate group is attached indirectly to nitrogen by nonionic bonding.

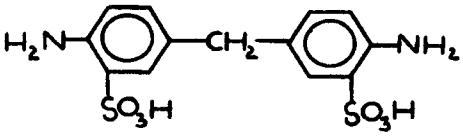
(1) Note. An example of a compound provided for herein is:



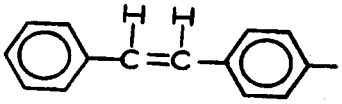
59 This subclass is indented under subclass 58. Compounds wherein plural benzene rings are bonded to each other or to the same acyclic carbon.

(1) Note. Examples of compounds provided for herein are:



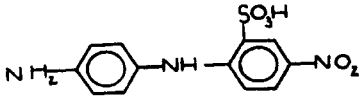


60 This subclass is indented under subclass 58. Compounds which contain the following group, wherein substitution may be made for hydrogen only:



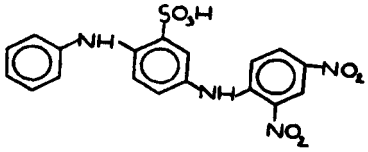
61 This subclass is indented under subclass 58. Compounds wherein a nitrogen atom is bonded to more than one benzene ring.

(1) Note. An example of a compound provided for herein is:



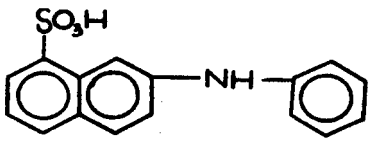
62 This subclass is indented under subclass 61. Compounds wherein each of two benzene rings is bonded directly to two nitrogen atoms.

(1) Note. An example of a compound provided for herein is:



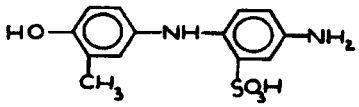
63 This subclass is indented under subclass 61. Compounds wherein the nitrogen is bonded directly to a benzene ring that is part of a naphthalene ring system.

(1) Note. An example of a compound provided for herein is:

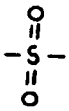


64 This subclass is indented under subclass 61. Compounds wherein a benzene ring is bonded directly to oxygen.

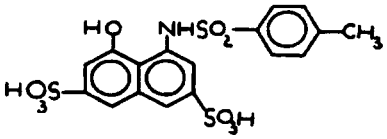
(1) Note. An example of a compound provided for herein is:



65 This subclass is indented under subclass 58. Compounds wherein the nitrogen is bonded directly to sulfonyl:

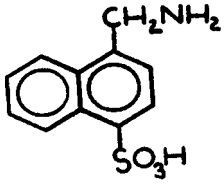


(1) Note. An example of a compound provided for herein is:



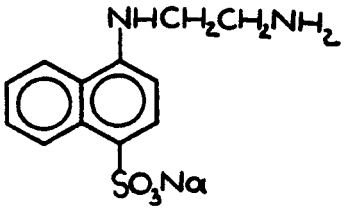
66 This subclass is indented under subclass 58. Compounds wherein a benzene ring is attached indirectly to the nitrogen by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



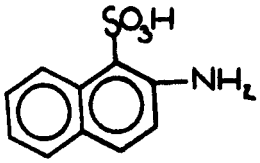
67 This subclass is indented under subclass 66. Compounds wherein the sulfonate group is further attached indirectly to an additional nitrogen by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



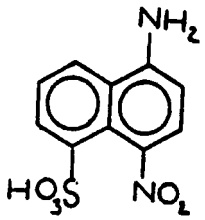
68 This subclass is indented under subclass 58. Compounds wherein the sulfur of the sulfonate group is bonded directly to a polycyclo ring system consisting of benzene rings.

(1) Note. An example of a compound provided for herein is:



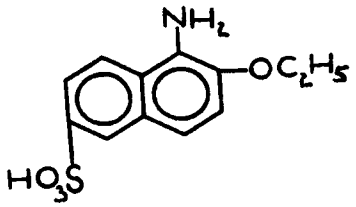
69 This subclass is indented under subclass 68. Compounds wherein the polycyclo ring system is bonded directly to a nitro or nitroso group.

(1) Note. An example of a compound provided for herein is:



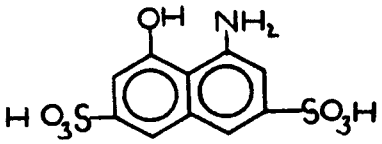
70 This subclass is indented under subclass 68. Compounds wherein the polycyclo ring system is bonded directly to oxygen.

(1) Note. An example of a compound provided for herein is:



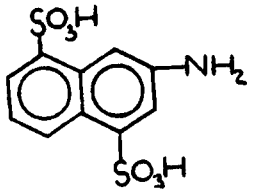
71 This subclass is indented under subclass 70. Compounds wherein the polycyclo ring system is bonded directly to plural sulfonate groups.

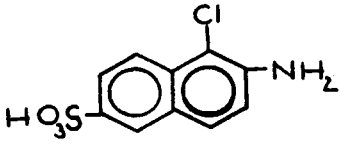
(1) Note. An example of a compound provided for herein is:

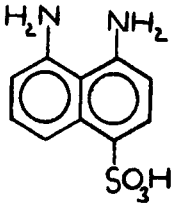


72 This subclass is indented under subclass 68. Compounds wherein the polycyclo ring system is bonded directly to halogen, to plural nitrogens, or to plural sulfonate groups.

(1) Note. Examples of compound provided for herein are:

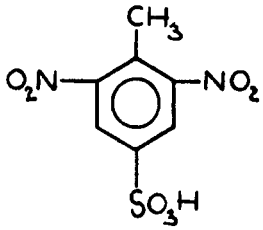


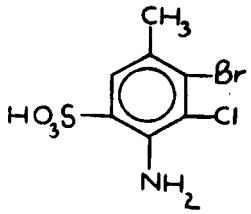




73 This subclass is indented under subclass 58. Compounds wherein a benzene ring is bonded directly to nitro or to halogen.

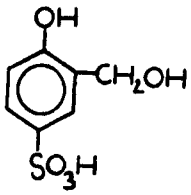
(1) Note. Examples of compound provided for herein are:





74 This subclass is indented under subclass 45. Compounds wherein the sulfonate group is attached indirectly by nonionic bonding to a chalcogen (i.e., oxygen, sulfur, selenium, or tellurium) that is not part of a sulfonate group.

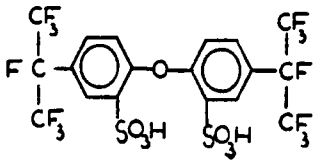
(1) Note. An example of a compound provided for herein is:



(2) Note. Compounds within the scope of this subclass and its indents may contain plural sulfonate groups, provided the required nonsulfonate chalcogen is present.

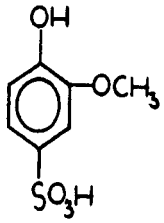
75 This subclass is indented under subclass 74. Compounds wherein the nonsulfonate chalcogen is bonded directly to two benzene rings.

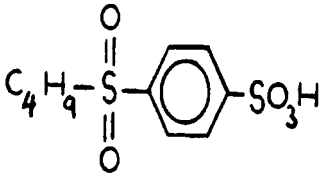
(1) Note. An example of a compound provided for herein is:



76 This subclass is indented under subclass 74. Compounds wherein the nonsulfonate chalcogen is bonded directly to plural carbons.

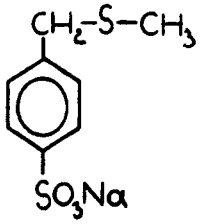
(1) Note. Examples of compound provided for herein are:

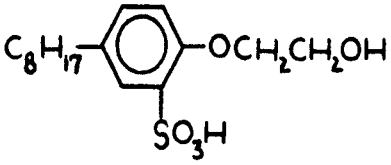




77 This subclass is indented under subclass 76. Compounds wherein a benzene ring is attached indirectly to a hydroxy group or to a nonsulfonate sulfur by acyclic nonionic bonding.

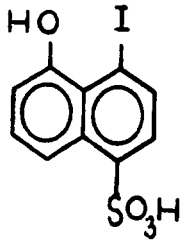
(1) Note. Examples of compounds provided for herein are:





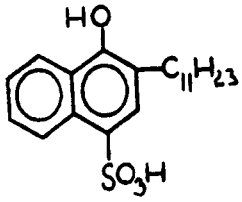
78 This subclass is indented under subclass 74. Compounds wherein the sulfonate group is attached indirectly to halogen by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



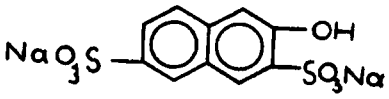
79 This subclass is indented under subclass 74. Compounds wherein oxygen and the sulfonate group are bonded directly to the same polycyclo ring system consisting of benzene rings.

(1) Note. An example of a compound provided for herein is:



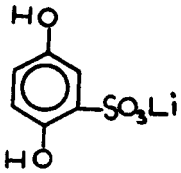
80 This subclass is indented under subclass 79. Compounds wherein the polycyclo ring system consisting of benzene rings is bonded directly to an additional sulfonate group.

(1) Note. An example of a compound provided for herein is:



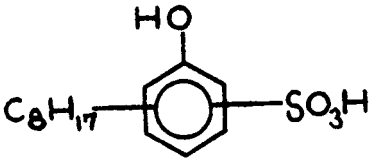
81 This subclass is indented under subclass 74. Compounds wherein a benzene ring is bonded directly to more than one oxygen.

(1) Note. An example of a compound provided for herein is:



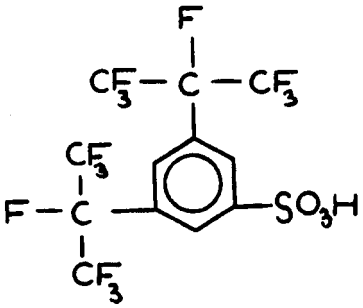
82 This subclass is indented under subclass 74. Compounds wherein a benzene ring is bonded directly to each of the sulfonate group, oxygen, and alkyl of at least four carbons.

(1) Note. An example of a compound provided for herein is:



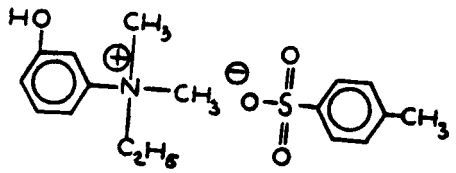
83 This subclass is indented under subclass 45. Compounds wherein the sulfonate group is attached indirectly to halogen by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



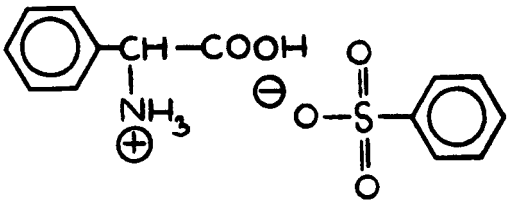
84 This subclass is indented under subclass 45. Compounds wherein the single bonded oxygen of the sulfonate group is bonded directly to organic nitrogen by ionic bonding.

(1) Note. An example of a compound provided for herein is:



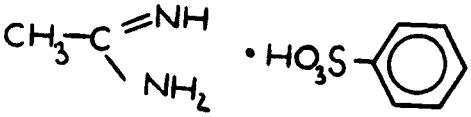
85 This subclass is indented under subclass 84. Compounds wherein the organic nitrogen is attached indirectly by nonionic bonding to -C(=X)-, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. An example of a compound provided for herein is:



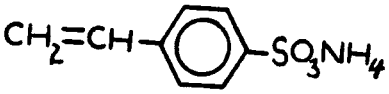
86 This subclass is indented under subclass 84. Compounds wherein the organic nitrogen is part of a cation containing carbon double bonded to nitrogen.

(1) Note. An example of a compound provided for herein is:



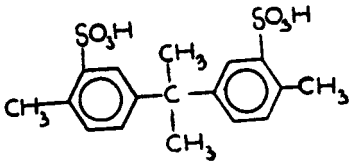
87 This subclass is indented under subclass 45. Compounds which contain unsaturation between acyclic carbon atoms.

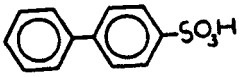
(1) Note. An example of a compound provided for herein is:



88 This subclass is indented under subclass 45. Compounds wherein an acyclic carbon or an acyclic carbon chain is bonded directly to plural benzene rings, or two benzene rings are bonded directly to each other.

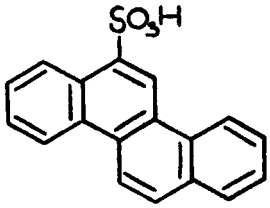
(1) Note. Examples of compounds provided for herein are:





89 This subclass is indented under subclass 45. Compounds wherein the sulfonate group is bonded directly to a polycyclo ring system consisting of benzene rings.

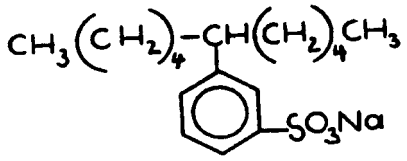
(1) Note. An example of a compound provided for herein is:



90 This subclass is indented under subclass 89. Processes wherein naphthalene, per se, or an alkyl substituted naphthalene, is sulfonated.

91 This subclass is indented under subclass 45. Compounds wherein a benzene ring is bonded to both the sulfonate group, and to alkyl of at least four carbons.

(1) Note. An example of a compound provided for herein is:



92 This subclass is indented under subclass 91. Products wherein the sulfonic acid or salt thereof is mixed with stabilizing or preserving agent, whose sole function is to prevent physical or chemical change, or with a color or odor affecting additive, whose sole function is to improve color or odor qualities.

93 This subclass is indented under subclass 91. Processes which include the step of alkylating a benzene ring, and the products of such processes.

94 This subclass is indented under subclass 93. Processes wherein an olefin is used as the alkylating agent.

95 This subclass is indented under subclass 91. Processes which include the step of sulfonating a benzene ring.

(1) Note. Sulfonating agents which can be used include sulfur trioxide, sulfuric acid, and oleum.

96 This subclass is indented under subclass 91. Processes wherein the sulfonic acid, or salt thereof, is separated from impurities or from the reaction mixture.

97 This subclass is indented under subclass 91. Processes wherein a sulfonic acid is converted to a salt thereof, or a salt of a sulfonic acid is converted to the free acid.

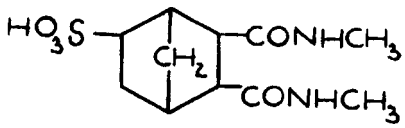
98 This subclass is indented under subclass 45. Processes wherein sulfur trioxide or oleum is used to sulfonate a benzene ring.

(1) Note. Oleum is a mixture of sulfur trioxide and sulfuric acid.

99 This subclass is indented under subclass 45. Processes wherein sulfuric acid is used to sulfonate a benzene ring.

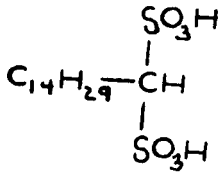
100 This subclass is indented under subclass 30. Compounds wherein the sulfonate group is attached directly or indirectly to a polycyclo alicyclic ring system by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



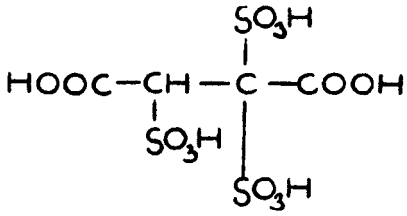
101 This subclass is indented under subclass 30. Compounds wherein the sulfonate group is attached indirectly to an additional sulfonate group by acyclic nonionic bonding.

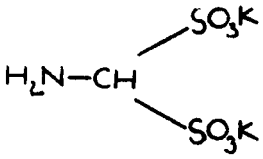
(1) Note. An example of a compound provided for herein is:



102 This subclass is indented under subclass 101. Compounds wherein the sulfonate groups are attached indirectly to nitrogen or to -C(=X)-, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), by nonionic bonding.

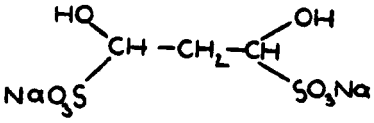
(1) Note. Examples of compounds provided for herein are:





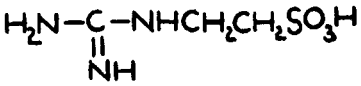
103 This subclass is indented under subclass 101. Compounds wherein the sulfonate groups are attached indirectly to plural nonsulfonate chalcogens (i.e., oxygen, sulfur, selenium or tellurium) by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



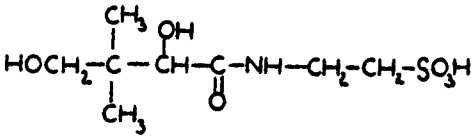
104 This subclass is indented under subclass 30. Compounds wherein the sulfonate group is attached indirectly to nitrogen by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



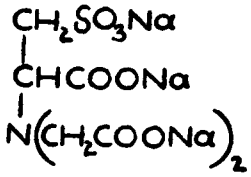
105 This subclass is indented under subclass 104. Compounds wherein the sulfonate group is attached indirectly to -C(=X)-, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



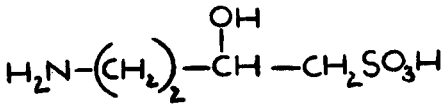
106 This subclass is indented under subclass 105. Compounds wherein the sulfonate group is attached indirectly to plural nitrogens or to plural -C(=X)-groups by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



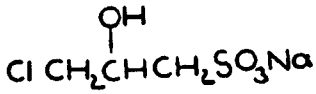
107 This subclass is indented under subclass 104. Compounds wherein the sulfonate group is attached indirectly to chalcogen (i.e., oxygen, sulfur, selenium or tellurium) by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



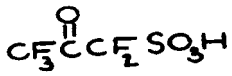
108 This subclass is indented under subclass 30. Compounds wherein the sulfonate group is attached indirectly to chalcogen (i.e., oxygen, sulfur, selenium or tellurium) by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



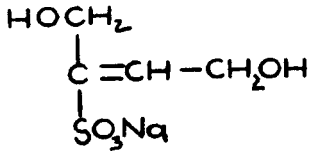
109 This subclass is indented under subclass 108. Compounds wherein the chalcogen, X, is double bonded to carbon in a -C(=X)- group.

(1) Note. An example of a compound provided for herein is:



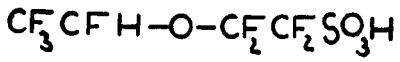
110 This subclass is indented under subclass 108. Compounds wherein the sulfonate group is attached indirectly to plural chalcogens by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



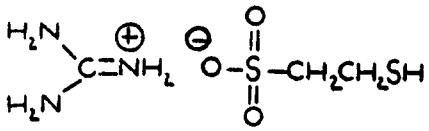
111 This subclass is indented under subclass 108. Compounds wherein the chalcogen is bonded directly to plural carbons.

(1) Note. An example of a compound provided for herein is:



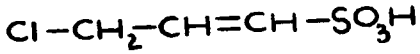
112 This subclass is indented under subclass 108. Compounds wherein the single bonded oxygen of the sulfonate group is bonded directly to organic nitrogen by ionic bonding.

(1) Note. An example of a compound provided for herein is:



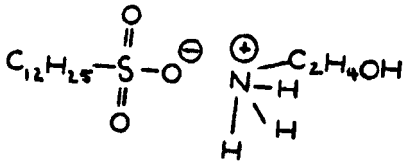
113 This subclass is indented under subclass 30. Compounds wherein the sulfonate group is attached indirectly to halogen by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



114 This subclass is indented under subclass 30. Compounds wherein the single bonded oxygen of the sulfonate group is bonded directly to organic nitrogen by ionic bonding.

(1) Note. An example of a compound provided for herein is:



115 This subclass is indented under subclass 30. Processes which are directed to the preparation, purification, recovery, or treatment in any way of a sulfonic acid or of a sulfonic acid salt.

116 This subclass is indented under subclass 115. Processes which involve formation of carbon-to-carbon unsaturation, hydrogenation or decarboxylation.

117 This subclass is indented under subclass 115. Processes wherein sulfonic acids are formed by conversion of sulfur containing hetero ring compounds.

(1) Note. An example of a process provided for herein is the conversion of an alkyl sultone to an alkene sulfonic acid by hydrolysis.

118 This subclass is indented under subclass 115. Processes wherein sulfonic acids are formed by oxidation of organic sulfur compounds.

(1) Note. An example of a process provided for herein is the nitric acid oxidation of a disulphide compound.

119 This subclass is indented under subclass 114. Processes which involve the hydrolysis of sulfonyl halides.

120 This subclass is indented under subclass 114. Processes wherein sulfonic acids, or salts of sulfonic acids, are formed by using inorganic sulfonating agents.

121 This subclass is indented under subclass 120. Processes wherein oxygen and sulfur dioxide are utilized.

(1) Note. An example of a process provided for herein is the reaction of an alkane with oxygen and sulfur dioxide to form alkane sulfonic acid.

122 This subclass is indented under subclass 120. Processes wherein an unsaturated hydrocarbon is reacted with sulfurous acid or with a salt thereof.

123 This subclass is indented under subclass 120. Processes wherein halosulfonic acid, sulfuric acid, oleum or sulfur trioxide is used.

124 This subclass is indented under subclass 115. Processes wherein a sulfonic acid or a salt thereof is separated from impurities or from the reaction mixture.

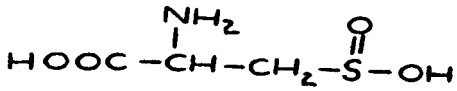
125 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain either of the two following groups: sulfinate or sulfenate, wherein, in either case, the single bonded oxygen is bonded directly to hydrogen, to a Group IA or IIA light metal, or to substituted or unsubstituted ammonium:

SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405 through 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, chalcogen, nitrogen, phosphorus, and group IA or IIA light metals.

126 This subclass is indented under subclass 125. Compounds wherein a sulfinate group is attached indirectly to nitrogen by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



400 **Carboxylic acids and salts thereof:**
This subclass is indented under subclass 1. Compounds under Class 532, ... wherein the acid function is a carboxyl group or a salt thereof.

(1) Note. Classification of salt formation from an acid or acid formation from the salt.

As a general rule a multistep synthesis is classified on the basis of the product produced by the last step of the synthesis. The formation of a salt from the corresponding acid or the "springing" of the acid from the corresponding salt is a synthesis step. However, these steps are so commonly used in final recovery procedures of a synthesis, that classification of a process on the basis of the general rule would result in distortion of the placement of patents where special process subclasses have been provided.

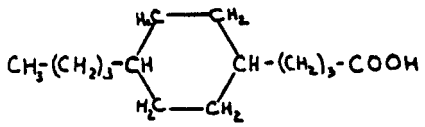
(a)In this classification, where special process subclasses have been provided and the last step of a claimed process appropriate thereto recites a salt formation or a hydrolysis of the salt to the acid, the patent has been placed in the appropriate process subclass.

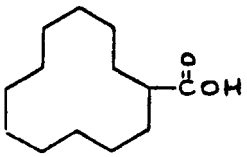
(b)As a general rule, a claimed process which combines synthesis steps with purification or recovery is classified with the synthesis. In those cases where a subclass has been provided for purification or recovery, per se, and the claimed pro-

cess appropriate thereto recites a broadly defined salt formation of the correspondidng acid or a broadly defined hydrolysis of a salt to the corresponding acid, the patent has been placed in the appropriate purification or recovery subclass. Where the claimed purification or recovery recites a significant salt formation step or a significant hydrolysis of a salt to the corresponding acid, the patent has been placed in the appropriate product subclass and cross-referenced to the purification or recovery subclass.

(2) Note. This subclass is residual for alicyclic carboxylic acids not provided for in subclasses 497-511.

(3) Note. This subclass contains, for example:





401 Racemization or separation of optical isomers:
This subclass is indented under subclass 400. Processes directed to the racemization or separation of optical isomers and includes the separation of diastereomers as well as the resolution of racemic mixtures of enantiomers.

(1) Note. This subclass contains patents wherein the separation is carried out by a chemical reaction, such as with a resolving agent, followed by physical separation and regeneration of the desired isomeric component.

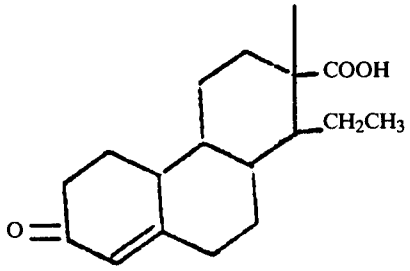
402 Physical resolution:
This subclass is indented under subclass 401. Processes wherein the separation is performed solely by physical means such as fractional crystallization.

403 Hydrophenanthrene nucleus:
This subclass is indented under subclass 400. Compounds which contain a hydrophenanthrene nucleus, not elsewhere provided.

(1) Note. Many of the patents found here are directed to compounds wherein the acid is obtained from a natural resin and has a known chemical structure as well as chemical modifications not provided for elsewhere.

(2) Note. The chemical treatment of a natural resin, followed by separation of a modified free natural resin acid of known chemical structure as a single chemical compound, is classified herein as is the product of such process.

(3) Note. This subclass contains, for example:



SEE OR SEARCH CLASS:

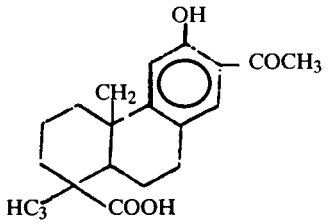
530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Natural Reaction Products Thereof, subclasses 200+ for separation of free natural resin acid mixtures, or of free natural resin acid of indeterminate struction from the natural resin.

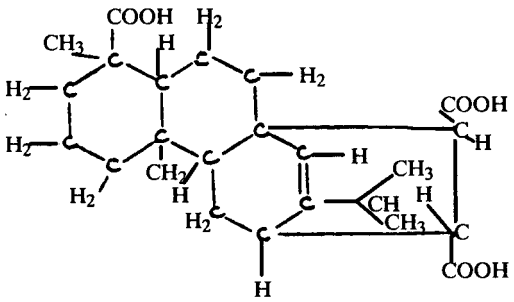
540, through 549,Organic Compounds, appropriate subclasses, for a free natural resin acid of known chemical structure which contains a heterocyclic group.

556, Organic Compounds, subclasses 1+, for heavy metal salts of free natural resin acids of known chemical structure.

404 1,4a-dimethyl hydrophenanthrene-1 carboxylic acids or salts thereof:
This subclass is indented under subclass 403. Compounds which contain the 1,4a-dimethyl hydrophenanthrene-1 carboxylic acid nucleus.

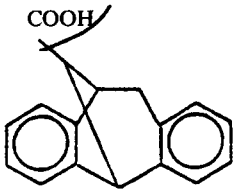
(1) Note. This subclass contains, for example:





405 Aromatic:
This subclass is indented under subclass 400. Compounds wherein the acid contains a benzene nucleus.

(1) Note. This subclass contains, for example:



SEE OR SEARCH THIS CLASS, SUBCLASS:

403+, for carboxylic acids and salts thereof wherein the acids contain a hydrophenanthrene nucleus and have a known chemical structure not elsewhere provided for, as for example, dihydroabietic acid or dehydroabietic acid.

406 Preparation by carbonylation:
This subclass is indented under subclass 405. Processes wherein an aromatic carboxylic acid is prepared through formation of a carboxyl group on an aromatic compound by reaction with carbon monoxide.

407 Formation of carboxyl group by oxidation:
This subclass is indented under subclass 405. Processes wherein a carboxyl group of an aromatic acid is formed by oxidation.

(1) Note. The term "oxidation" as utilized here includes processes where an oxidizing agent is utilized, as well as processes such as the dehydrogenation of alcohols and the hydrolysis of aromatic halo alkyl compounds. However, the formation of a carboxyl group by hydrolysis of functional derivatives of a carboxyl group are found in the product and process subclasses provided for the appropriate acid.

(2) Note. This subclass contains patents directed to the formation of aromatic carboxylic acids by oxidation of carbonaceous materials such as coal or coke.

408 Of aromatic compound:
This subclass is indented under subclass 407. Process wherein a carboxyl group is formed by oxidizing an aromatic compound.

(1) Note. This subclass contains processes of preparing aromatic carboxylic acids by oxidation of compounds, such as phenanthrene or trichlorobenzylamine.

409 Alkyl side chain oxidized:
This subclass is indented under subclass 408. Processes wherein the carboxyl group is formed by oxidation of an alkyl side chain of an aromatic nucleus.

(1) Note. This subclass contains processes wherein the oxidizing agent is, for example, potassium permanganate, chromic acid or its salts or manganese dioxide.

410 Nitrogen containing oxidant:
This subclass is indented under subclass 409. Processes wherein the oxidizing agent utilized contains nitrogen, as for example, nitric acid or oxides of nitrogen.

411 Sulfur containing oxidant:
This subclass is indented under subclass 409. Processes wherein the oxidizing agent utilized is sulfur or a sulfur containing compound.

412 Air, O_2, or O_3 Oxidant:
This subclass is indented under subclass 409. Processes wherein the oxidizing agent utilized is air, oxygen, or ozone.

413 Multistage:
This subclass is indented under subclass 412. Processes wherein the oxidation is carried out in plural sequential stages.

(1) Note. These processes include the use of multiple reactors where the product of oxidation in a first reactor is passed to a second reactor and further oxidized or may be carried out in a single reactor where the conditions for a second stage of oxidation are changed.

414 With recycle or recovery of reaction component:
This subclass is indented under subclass 412. Processes wherein components of the product of oxidation may be separated, further treated, and either recycled to the reaction chamber or recovered.

(1) Note. This subclass includes processes which claim a significant recovery step to produce the desired carboxylic acid or are directed to recovery and recycling of solvents, catalysts, or unoxidized or incompletely oxidized starting materials.

415 Gas phase:
This subclass is indented under subclass 412. Processes wherein the oxidation is conducted in a gas or vapor phase.

416 Halogen containing catalyst, initiator, or promoter utilized:
This subclass is indented under subclass 412. Processes wherein the oxidation process is carried out in the presence of a catalyst, or initiator or promoter which contains a halogen.

417 Initiator or promoter used with catalyst:
This subclass is indented under subclass 412. Processes wherein the oxidation is carried out with a catalyst and an additional material which may reduce the induction period or promote or regulate the oxidation rate to improve the yield or shorten the reaction time.

418 Of oxy or carbonyl containing compound:
This subclass is indented under subclass 408. Processes wherein the aromatic compounds which are oxidized contain an oxy group or a carbonyl group, such as, for example, aralkyl alcohols or aldehydes.

419 Hypohalite as oxidant:
This subclass is indented under subclass 418. Processes wherein the oxidizing agent is a hypohalite, such as, for example, sodium hypochlorite.

420 Nitrogen containing oxidant:
This subclass is indented under subclass 418. Processes wherein the oxidizing agent contains nitrogen, as for example, nitric acid or oxides of nitrogen.

421 Air, O_2, or O_3 Oxidant:
This subclass is indented under subclass 418. Processes wherein the oxidizing agent is air, oxygen, or ozone.

422 Of halo alkyl containing compounds:
This subclass is indented under subclass 408. Processes wherein the carboxyl group is formed by oxidizing a halo alkyl side chain of an aromatic compound.

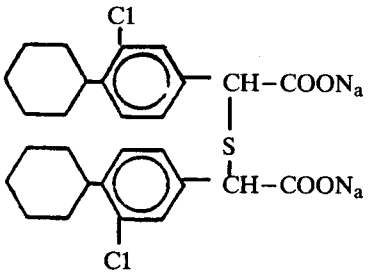
423 Preparation by carbonation:
This subclass is indented under subclass 405. Processes wherein an aromatic carboxylic acid is produced by reacting an aromatic compound with carbon dioxide or a material which will produce carbon dioxide under the reaction conditions, such as a carbonate.

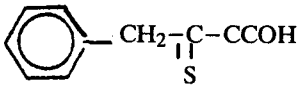
424 Of alkali metal phenolates:
This subclass is indented under subclass 423. Processes wherein an alkali metal phenolate is reacted with carbon dioxide to produce an aromatic hydroxy acid, as for example, the Kolbe-Schmitt reaction.

425 Having plural rings:
This subclass is indented under subclass 424. Processes wherein the alkali metal phenolate contains plural rings, as for example, a naphtholate which will produce a hydroxy naphthoic acid under the conditions of reaction.

426 Sulfur:
This subclass is indented under subclass 405. Compounds wherein the aromatic carboxylic acid contains sulfur, covalently bonded.

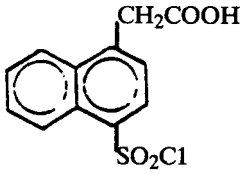
(1) Note. This subclass contains, for example:





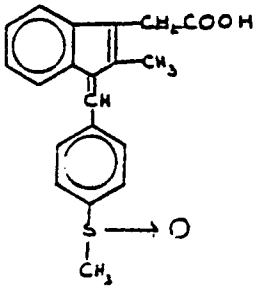
427 Polycyclo ring system:
This subclass is indented under subclass 426. Compounds wherein the acid contains at least two carbocyclic groups which are joined through two orthopositioned carbon atoms or through a bridge.

(1) Note. This subclass contains, for example:



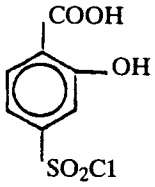
428 Indenyl or hydrindenyl:
This subclass is indented under subclass 427. Processes which contain the indenyl or hydrindenyl nucleus.

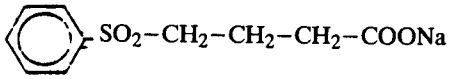
(1) Note. This subclass contains, for example:



429 Sulfoxy:
This subclass is indented under subclass 426. Compounds which contain sulfur bonded to oxygen and includes the groups -SO, $-SO_2$ and $-SO_2X$, where X is halogen.

(1) Note. This subclass contains, for example:





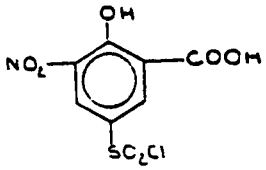
SEE OR SEARCH THIS CLASS, SUBCLASS:

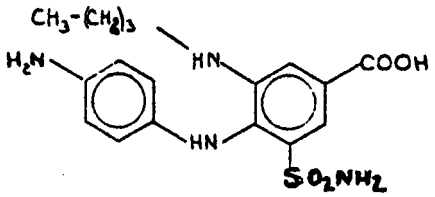
30+, for aliphatic compounds containing a sulfonic acid group.

430 Nitrogen:

This subclass is indented under subclass 429. Compounds wherein the acid also contains nitrogen.

(1) Note. This subclass contains, for example:



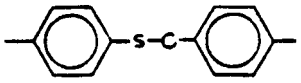


431 Carboxyl, or salt thereof, in side chain having sulfur bonded directly to a ring:

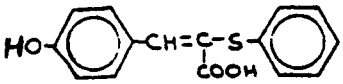
This subclass is indented under subclass 426. Compounds wherein the carboxyl group is attached to a side chain which contains sulfur bonded directly to a ring.

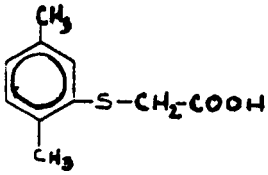
(1) Note. In this and subsequent subclasses, where the term "side chain" is used, it is intended to mean an acyclic chain uninterrupted by a cylic formation.

(2) Note. When the same sulfur atom is directly attached to one carbocyclic nucleus and indirectly attached to a second carbocyclic nucleus, it will always be considered as directly attached for classification, e.g.,



(3) Note. This subclass includes, for example:

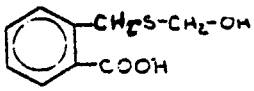


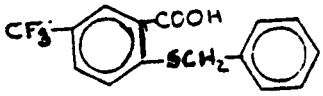


432 Carboxyl, or salt thereof, bonded directly to a ring:

This subclass is indented under subclass 426. Compounds wherein a carboxyl group is attached directly to a ring.

(1) Note. This subclass contains, for example:

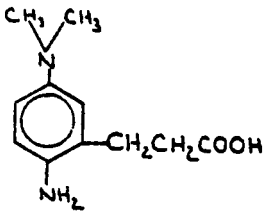


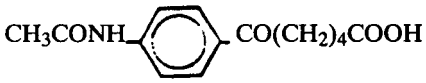


433 Nitrogen bonded directly to carbon of organic radical (e.g., amino acids, etc.):

This subclass is indented under subclass 405. Compounds wherein the acid contains nitrogen bonded directly to a carbon of an organic radical not provided for above.

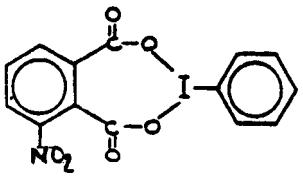
(1) Note. This subclass contains, for example:

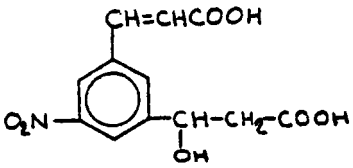




434 Nitro or nitroso:
This subclass is indented under subclass 433. Compounds wherein the acid contains the nitro group ($-NO_2$) or the nitroso group (-NO) bonded to carbon.

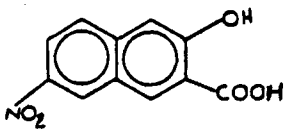
(1) Note. This subclass contains, for example:

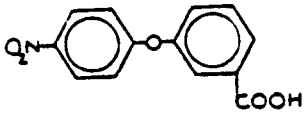




435 Plural rings:
This subclass is indented under subclass 434. Compounds wherein the acid contains more than one carbocyclic group, at least one of which is aromatic.

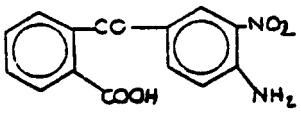
(1) Note. This subclass contains, for example:

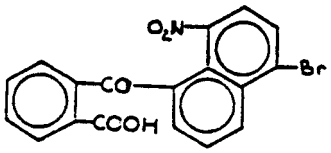




436 Plural rings bonded directly to the same carbonyl:
This subclass is indented under subclass 435. Compounds wherein the acid contains two carbocyclic nuclei directly attached to the same carbonyl group.

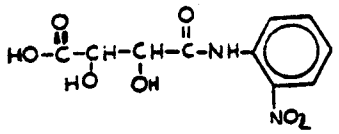
(1) Note. This subclass contains, for example:

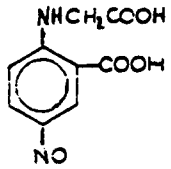




437 Plural nitrogens:
This subclass is indented under subclass 434. Compounds wherein the acid contains an additional nitrogen covalently bonded.

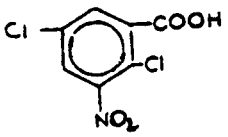
(1) Note. This subclass contains, for example:





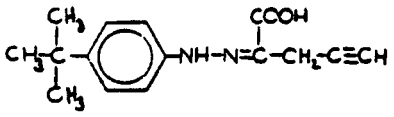
438 Halogen:
This subclass is indented under subclass 434. Compounds wherein the acid contains a halogen covalently bonded.

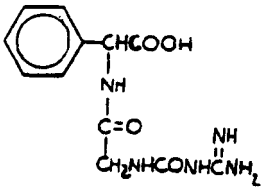
(1) Note. This subclass contains, for example:



439 Ureido, guanido, or hydrazine:
This subclass is indented under subclass 433. Compounds wherein the acid contains the ureido group (N-C(=O) -N), the guanido group (N-C(=N)-N) or the hydrazine group (N-N).

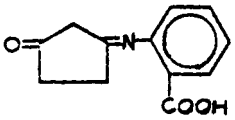
(1) Note. This subclass contains, for example.

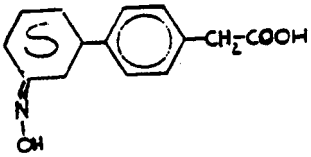




440 Nitrogen double bonded directly to carbon (e.g. amidine, ketimine, etc.):
This subclass is indented under subclass 433. Compounds wherein the acid contains an amidine group (-C(=N)-N) or the group -C=N- equivalent in structure to those formed by reacting an aldehyde or a ketone with ammonia or an amine.

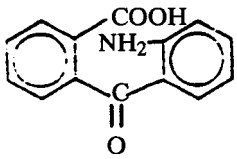
(1) Note. This subclass contains, for example:

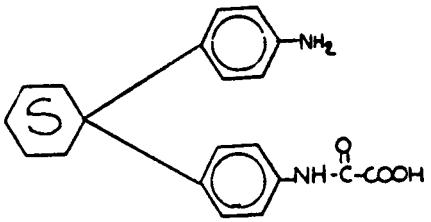




441 Plural rings bonded directly to the same carbon:
This subclass is indented under subclass 433. Compounds wherein the acid contains two carbocyclic nuclei directly attached to the same carbon, which may be the carbon of a methylene or a carbonyl group.

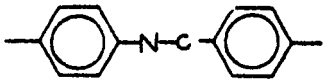
(1) Note. This subclass contains, for example:



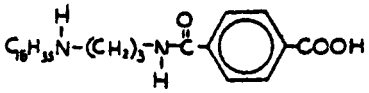


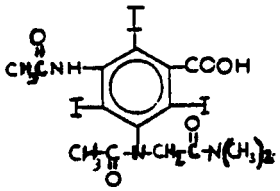
442 Nitrogen not bonded directly to a ring:
This subclass is indented under subclass 433. Compounds wherein the acid contains nitrogen which is not directly bonded to a carbocyclic nucleus.

(1) Note. When the same nitrogen is directly attached to one carbocyclic nucleus and indirectly attached to a second carbocyclic nucleus, it will always be considered as directly attached for classification, e.g.,



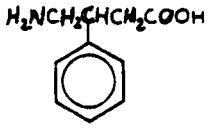
(2) Note. This subclass contains, for example:

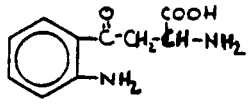




443 In same chain as carboxyl, or salt thereof:
This subclass is indented under subclass 442. Compounds wherein the acid contains a nitrogen which is in or attached to the same side chain that contains a carboxyl group, but is not attached directly to a carbocyclic nucleus.

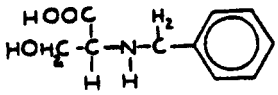
(1) Note. This subclass contains, for example:

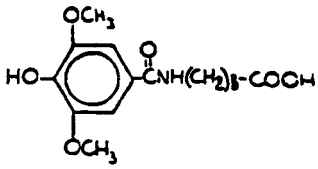




444 Oxy:
This subclass is indented under subclass 443. Compounds wherein the acid contains the group -OX attached to a noncarbonylic carbon, where X is a non-carbonyclic C, H, or an alcoholate forming group not provided for above.

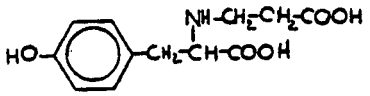
(1) Note. This subclass contains, for example:

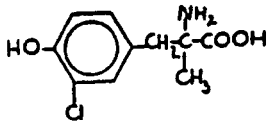




445 Phenyl alanines:
This subclass is indented under subclass 444. Compounds wherein the acid contains a phenyl alanine group.

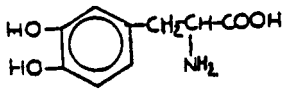
(1) Note. This subclass contains, for example:





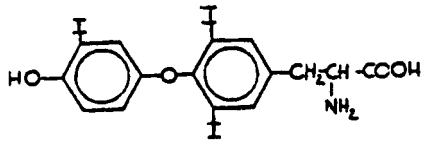
446 Di-oxy phenyl alanines:
This subclass is indented under subclass 445. Compounds wherein the acid contains two -OX groups, each of which is attached directly to the phenyl of the phenyl alanine group, where X is a noncarbonylic C, H, or an alcoholate forming group not provided for above.

(1) Note. This subclass contains, for example:



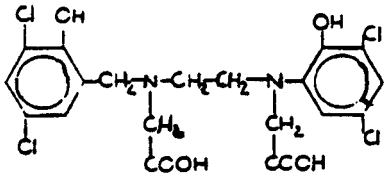
447 Phenoxyphenyl alanines:
This subclass is indented under subclass 445. Compounds wherein the acid contains a phenoxy group attached to the phenyl of the phenyl alanine.

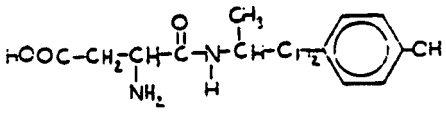
(1) Note. This subclass contains, for example:



448 Plural nitrogens:
This subclass is indented under subclass 44. Compounds wherein the acid contains more than one covalently bonded nitrogen.

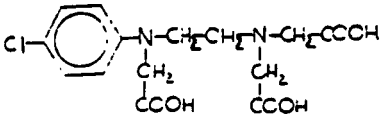
(1) Note. This subclass contains, for example:

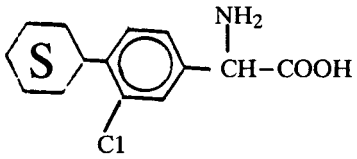




449 Halogen:
This subclass is indented under subclass 433. Compounds wherein the acid contains halogen covalently bonded.

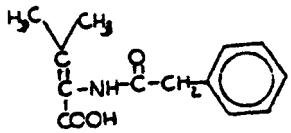
(1) Note. This subclass contains, for example:

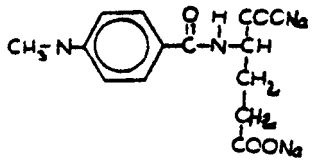




450 Amide:
This subclass is indented under subclass 443. Compounds wherein the acid contains the carbonyl residue of a carboxylic acid attached to a nitrogen to form an amide (-C(O)N).

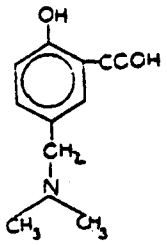
(1) Note. This subclass contains, for example:

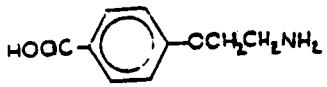




451 Oxy:
This subclass is indented under subclass 442. Compounds wherein the acid contains an -OX group bonded to a noncarbonylic carbon, where X is a noncarbonylic carbon, H, or an alcoholate forming group not provided for above.

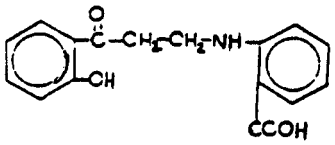
(1) Note. This subclass contains, for example:

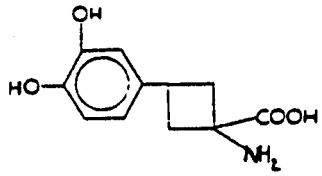




452 Oxy:
This subclass is indented under subclass 433. Compounds wherein the acid contains an -OX group bonded to a noncarbonylic carbon, where X is a noncarbonylic C, H, or an alcoholate forming group not provided for above.

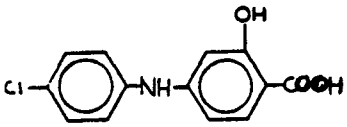
(1) Note. This subclass contains, for example.

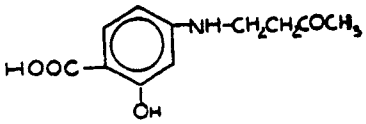




453 Carboxyl, or salt thereof, nitrogen and oxygen all bonded directly to the same benzene ring:
This subclass is indented under subclass 452. Compounds wherein the acid contains nitrogen, an oxy group, and a carboxyl group, all attached directly to the same benzene ring.

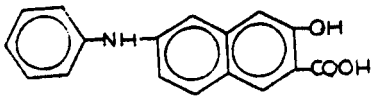
(1) Note. This subclass contains, for example:

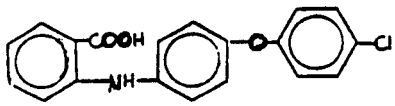




454 Aryl-N-Aryl:
This subclass is indented under subclass 452. Compounds wherein the acid contains two aromatic nuclei attached to the same nitrogen.

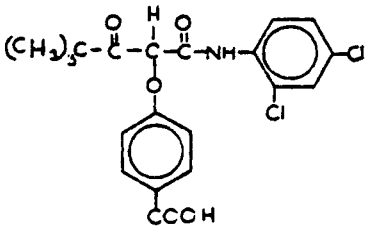
(1) Note. This subclass contains, for example:

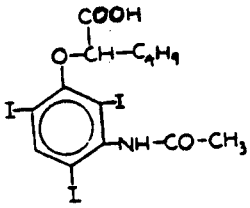




455 Amide:
This subclass is indented under subclass 452. Compounds wherein the acid contains the carbonylic residue of a carboxylic acid directly attached to a nitrogen, forming an amide.

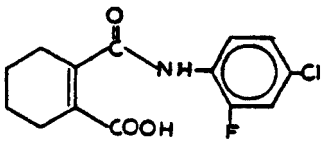
(1) Note. This subclass contains, for example:

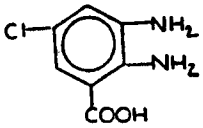




456 Halogen:
This subclass is indented under subclass 433. Compounds wherein the acid contains covalently bonded halogen.

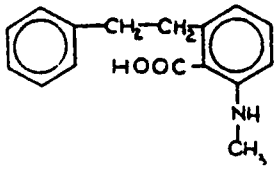
(1) Note. This subclass contains, for example:

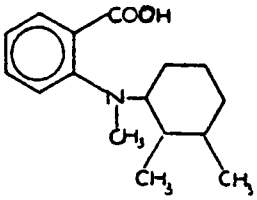




457 Plural rings with nitrogen bonded directly to at least one ring:
This subclass is indented under subclass 433. Compounds wherein the acid contains more than one carbocyclic group and nitrogen is bonded directly to at least one of them.

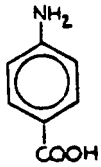
(1) Note. This subclass contains, for example:





458 Carboxyl, or salt thereof, bonded directly to a ring:
This subclass is indented under subclass 433. Compounds wherein the acid contains a carboxyl group bonded directly to a carbocyclic nucleus.

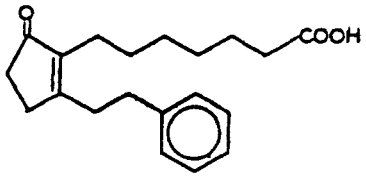
(1) Note. This subclass contains, for example:

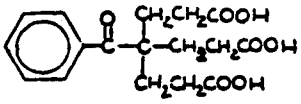


459 Aldehyde or ketone:
This subclass is indented under subclass 405. Compounds wherein the acid contains the group -C(O) X bonded to carbon, where X is C

or H, i.e., aldehyde or ketone group containing acids.

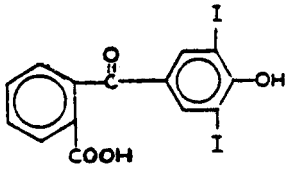
(1) Note. This subclass contains, for example:

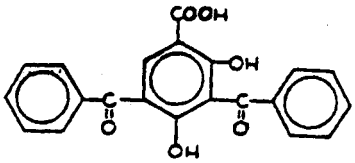




460 Two rings bonded directly to the same carbonyl:
This subclass is indented under subclass 459. Compounds wherein the acid contains two carbocyclic nuclei bonded directly to one carbonyl group.

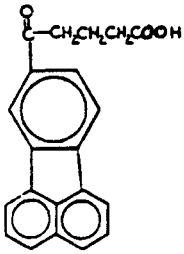
(1) Note. This subclass contains, for example:

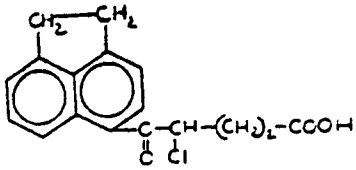




461 Polycyclo ring system:
This subclass is indented under subclass 459. Compounds wherein the acid contains two or more carbocyclic nuclei joined to each other through two orthopositioned carbons or through a bridge.

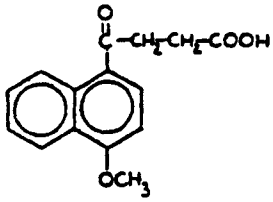
(1) Note. This subclass contains, for example:

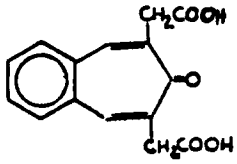




462 Bicyclo ring system:
This subclass is indented under subclass 461. Compounds wherein the acid contains two carbocyclic nuclei joined to each other through two orthopositioned carbons or through a bridge.

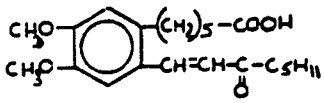
(1) Note. This subclass contains, for example:

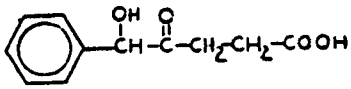




463 Oxy:
This subclass is indented under subclass 459. Compounds wherein the acid contains an -OX group attached to a noncarbonylic carbon, where X is noncarbonylic C, H, or an alcoholate forming group not provided for above.

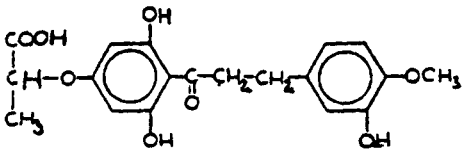
(1) Note. This subclass contains, for example:

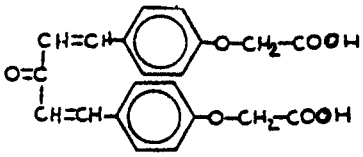




464 Phenoxy alkanoic acids:
This subclass is indented under subclass 463. Compounds wherein the acid contains a carboxyl group on a side chain containing an oxy group directly bonded to a benzene ring.

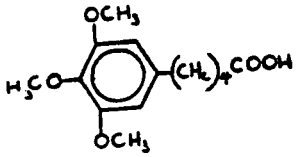
(1) Note. This subclass contains, for example:

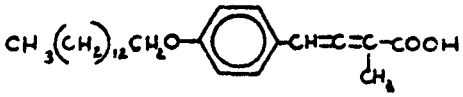




465 Oxy:
This subclass is indented under subclass 405. Compounds wherein the acid contains an -OX group attached to a noncarbonylic carbon, where X is a noncarbonylic C, H, or an alcoholate forming group not provided for above.

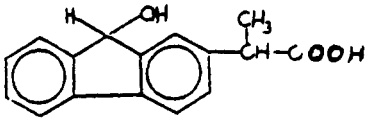
(1) Note. This subclass contains, for example:

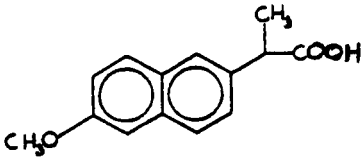




466 Polycyclo ring system:
This subclass is indented under subclass 465. Compounds wherein the acid contains two or more carbocyclic nuclei which are joined to each other through two orthopositioned carbons or through a bridge.

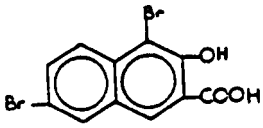
(1) Note. This subclass contains, for example:

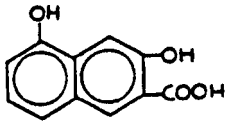




467 Carboxyl bonded directly to naphthylene ring system:
This subclass is indented under subclass 466. Compounds wherein the acid contains a naphthylene nucleus having a carboxyl group directly bonded to it.

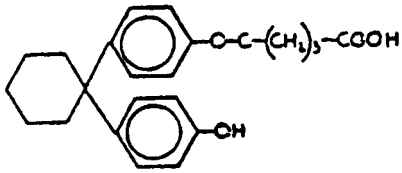
(1) Note. This subclass contains, for example:





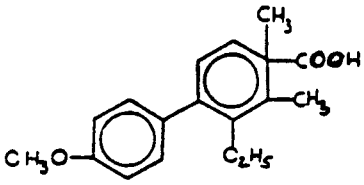
468 Plural rings bonded directly to the same carbon:
This subclass is indented under subclass 465. Compounds wherein the acid contains two carbocyclic nuclei bonded to one methylene group.

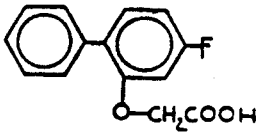
(1) Note. This subclass contains, for example:



469 Rings bonded directly to each other:
This subclass is indented under subclass 465. Compounds wherein the acid contains two carbocyclic nuclei joined to each other by one covalent bond.

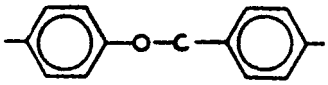
(1) Note. This subclass contains, for example:



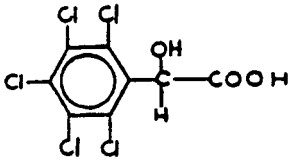


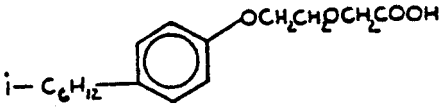
470 Oxy, not bonded directly to a ring, in same side chain as carboxyl, or salt thereof:
This subclass is indented under subclass 465. Compounds wherein the acid contains an oxy group, which is not bonded directly to a carbocyclic group and which is in or bonded to a side chain which contains a carboxyl group.

(1) Note. When the same oxygen is directly bonded to one carbocyclic nucleus and indirectly bonded to a second carbocyclic nucleus, it will always be considered as directly bonded for classification, e.g.,



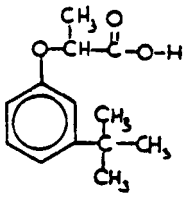
(2) Note. This subclass contains, for example:

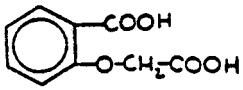




471 Oxy, bonded directly to a ring, in same side chain as carboxyl, or salt thereof:
This subclass is indented under subclass 465. Compounds wherein the acid contains an oxy group which is directly bonded to a carbocyclic nucleus and is in a side chain which contains a carboxyl group.

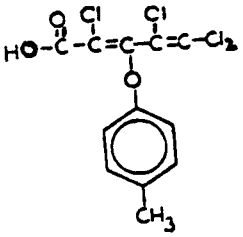
(1) Note. This subclass contains, for example:

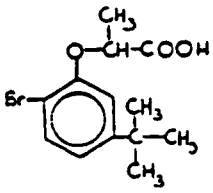




472 Halogen:
This subclass is indented under subclass 471. Compounds wherein the acid contains covalently bonded halogen.

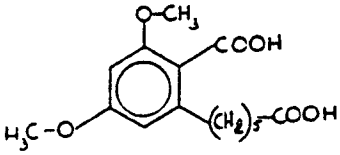
(1) Note. This subclass contains, for example:

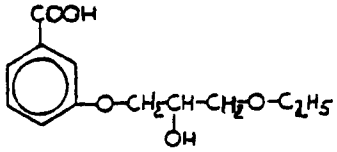




473 Carboxyl, or salt thereof, bonded directly to a ring:
This subclass is indented under subclass 465. Compounds wherein the acid contains a carboxyl group bonded directly to a carbocyclic nucleus.

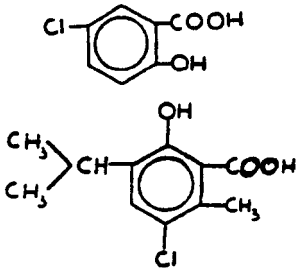
(1) Note. This subclass contains, for example:





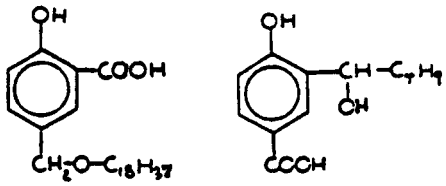
474 Halogen:
This subclass is indented under subclass 473. Compounds wherein the acid contains covalently bonded halogen.

(1) Note. This subclass contains, for example:



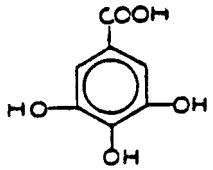
475 Phenolic hydroxy or metallate:
This subclass is indented under subclass 473. Compounds wherein the acid contains an -OX group directly bonded to a benzene ring, where X is H or a metal not provided for above.

(1) Note. This subclass contains, for example:

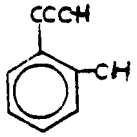


476 Poly phenolic hydroxy or metallate:
This subclass is indented under subclass 475. Compounds wherein the acid contains more than one -OX group bonded directly to a benzene ring, where X is H or a metal not provided for above.

(1) Note. This subclass contains, for example:

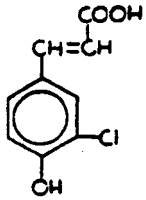


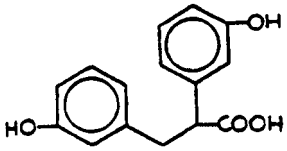
477 Salicylic acid, per se, or salt thereof:
This subclass is indented under subclass 475. The compound, which is salicylic acid or its salts and processes for its preparation not provided for above.



478 Phenolic hydroxy or metallate:
This subclass is indented under subclass 465. Compounds wherein the acid contains an -OX group bonded directly to a benzene ring, where X is an H or a metal not provided for above.

(1) Note. This subclass contains, for example:

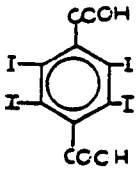


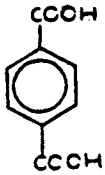


479 Decarboxylation of polycarboxylic acid or salt:
This subclass is indented under subclass 405. Processes wherein a carboxyl group of a polycarboxylic acid or an anhydride thereof is destroyed to produce an aromatic carboxylic acid, as for example, the production of benzoic acid from phthalic acid.

480 Polycarboxylic acids or salts thereof:
This subclass is indented under subclass 405. Compounds wherein the acid contains more than one carboxyl group.

(1) Note. This subclass contains, for example:





481 Prepared by disproportionation:
This subclass is indented under subclass 480. Processes wherein the alkali metal salt of an aromatic carboxylic acid is reacted under conditions wherein one molecule is decarboxy-

lated and another molecule carboxylated. For example, in the Henkel Reaction sodium benzoate will produce benzene and phthalic acid.

482 Preparation by isomerization:
This subclass is indented under subclass 480. Processes wherein the acid is produced by isomerization, as for example, in the Henkel Rearrangement Reaction wherein phthalic acid is isomerized to terephthalic acid.

483 Preparation by hydrolysis of amide, anhydride, or ester:
This subclass is indented under subclass 480. Processes wherein the acid is produced by hydrolysis of an amide, an anhydride, or an ester.

(1) Note. The production of a polycarboxylic acid by hydrolysis of its corresponding salt is placed in the appropriate product subclass.

484 Preparation by hydrolysis of nitrile:
This subclass is indented under subclass 480. Processes wherein the acid is produced by hydrolysis of a nitrile.

485 Purification or recovery, per se:
This subclass is indented under subclass 480. Processes which are directed to the purification, separation, or recovery of aromatic polycarboxylic acids.

(1) Note. See subclasses 408+, and particularly subclass 414 for patents which claim the combination of formation of a carboxyl group by oxidation followed by a significant purification or recovery step.

(2) Note. See (1) Note (b) under subclass 400 for the placement of patents claiming the purification or recovery of an acid combined with a salt forming or salt hydrolysis step.

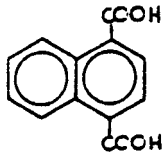
486 By crystallization:
This subclass is indented under subclass 485. Processes wherein the purification or recovery involves a significant crystallization step.

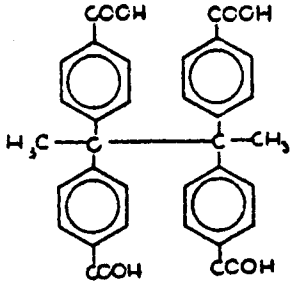
487 By reaction of undesired component:
This subclass is indented under subclass 485. Processes wherein the purification or recovery of the acid includes the reaction of an undesired component.

SEE OR SEARCH CLASS:
203, Distillation: Processes, Separatory, subclasses 28+ for processes involving reaction of an impurity following by distillation to recover a desired product.

488 Plural rings:
This subclass is indented under subclass 480. Compounds wherein the acid cotains more than one carbocyclic nucleus.

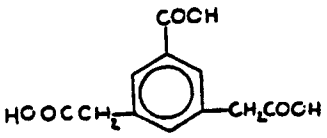
(1) Note. This subclass contains, for example:

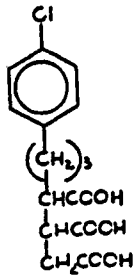




489 Carboxyl not directly attached to a ring:
This subclass is indented under subclass 480. Compounds wherein the acid contains a carbocyclic group which is not directly bonded to a carbocyclic nucleus.

(1) Note. This subclass contains, for example:

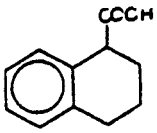


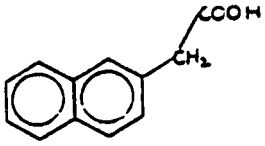


490 Naphthyl group:
This subclass is indented under subclass 405. Compounds wherein the acid contains the naphthyl nucleus or its partially hydrogenated form and only one carboxyl group.

(1) Note. See subclass 488 for compounds containing the naphthyl group and more than one carboxyl group.

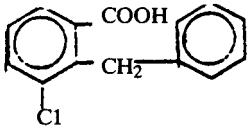
(2) Note. This subclass contains, for example:

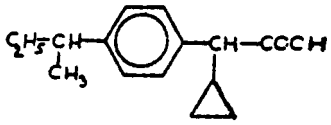




491 Plural rings bonded directly to the same carbon:
This subclass is indented under subclass 405. Compounds wherein the acid contains two carbocyclic nuclei bonded to one methylene group and has only one carboxyl group.

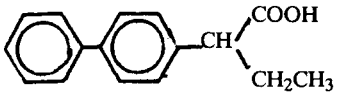
(1) Note. This subclass contains, for example:

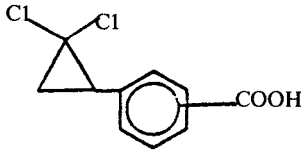




492 Rings bonded directly to each other:
This subclass is indented under subclass 405. Compounds wherein the acid contains two carbocyclic nuclei joined to each other by one covalent bond and only one carboxyl group.

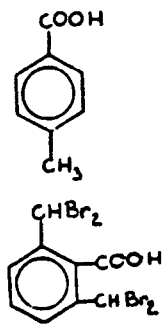
(1) Note. This subclass contains, for example:





493 Monocyclic:
This subclass is indented under subclass 405. Compounds wherein the acid contains only one carbocyclic nucleus, which is a benzene ring and only one carboxyl group.

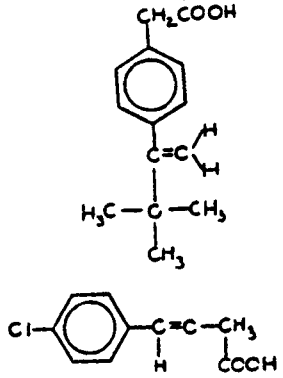
(1) Note. This subclass contains, for example:



494 Purification or recovery, per se:
This subclass is indented under subclass 493. Processes directed to the purification, separation, or recovery of aromatic monocyclic monocarboxylic acids.

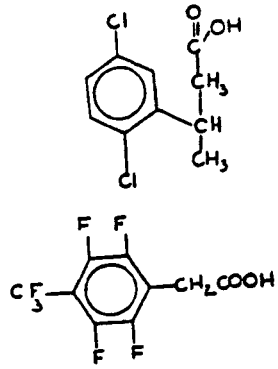
495 Additional unsaturation:
This subclass is indented under subclass 493. Compounds wherein the acid coantains ethylenic or acetylenic unsaturation.

(1) Note. This subclass contains, for example:



496 Carboxyl, or salt thereof, not bonded directly to the ring:
This subclass is indented under subclass 493. Compounds wherein the acid contains a carboxyl group not directly bonded to the benzene ring.

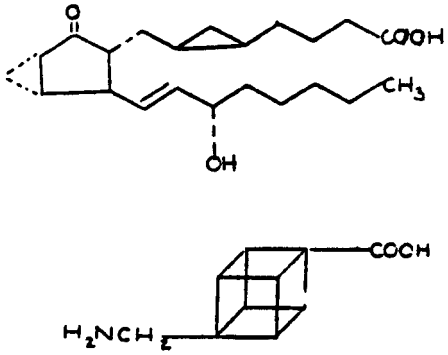
(1) Note. This subclass contains for example:



497 Preparing alicyclic acids by carbonylation:
This subclass is indented under subclass 400. Processes wherein an alicyclic carboxylic acid is prepared through formation of a carboxyl group on an alicyclic compound by reaction with carbon monoxide.

498 Plural alicyclic rings:
This subclass is indented under subclass 400. Compounds wherein the acid contains more than one alicyclic nucleus.

(1) Note. This subclass contains, for example:

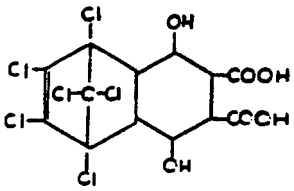


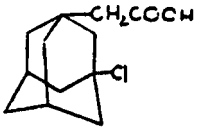
SEE OR SEARCH CLASS:
552, Organic Compounds, subclass 653 for acids of Vitamin D and 3-5 cyclovitamin D compounds, etc.

499 Tricyclo ring system:
This subclass is indented under subclass 498. Compounds wherein the acid contains three alicyclic nuclei joined to each other through two orthopositioned carbons or by a bridge.

(1) Note. See subclasses 403+ for carboxylic acids where the tricyclo ring system is hydrophenanthrene.

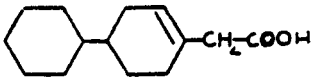
(2) Note. This subclass contains, for example:





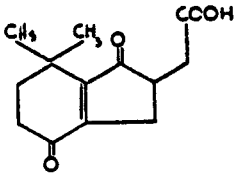
500 Two rings only:
This subclass is indented under subclass 498. Compounds wherein the acid contains only two alicyclic nuclei.

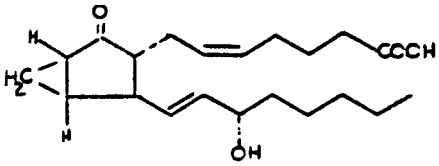
(1) Note. This subclass contains, for example:



501 Orthofused:
This subclass is indented under subclass 500. Compounds wherein the acid contains two alicyclic nuclei joined to each other through two orthopositioned carbons.

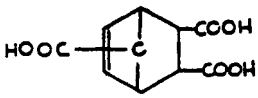
(1) Note. This subclass contains, for example:

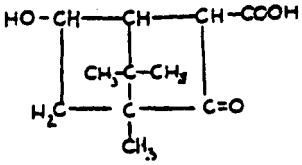




502 2,2,1-Bicyclo:
This subclass is indented under subclass 500. Compounds wherein the acid contains a 2,2,1-bicyclo ring system.

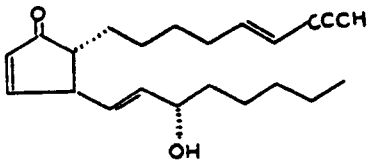
(1) Note. This subclass contains, for example:

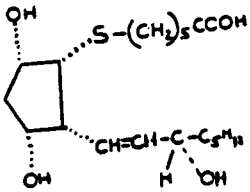




503 Cyclopentyl (e.g., prostoglandins, etc.):
This subclass is indented under subclass 400. Compounds wherein the acid contains a cyclopentyl nucleus, as for example, prostoglandins.

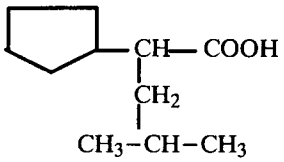
(1) Note. This subclass contains, for example:

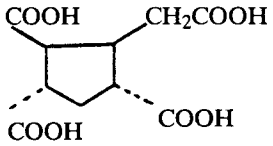




504 Cyclopentyl-$(C)_x$ - COOH; x=0-2:
This subclass is indented under subclass 503. Compounds wherein the acid contains a carboxyl group which is directly bonded to a cyclopentyl nucleus or is attached thereto through a chain of no more than two carbons.

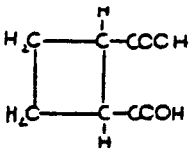
(1) Note. This subclass contains, for example:

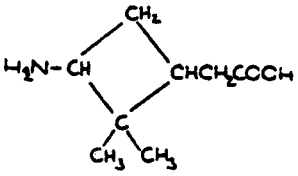




505 Cyclobutyl:
This subclass is indented under subclass 400. Compounds wherein the acid contains a cyclobutyl nucleus.

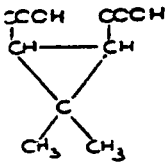
(1) Note. This subclass contains, for example:

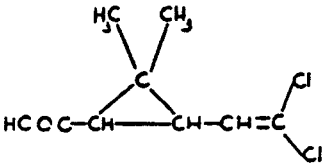




506 Cyclopropyl:
This subclass is indented under subclass 400. Compounds wherein the acid contains a cyclopropyl nucleus.

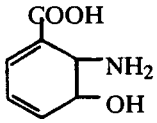
(1) Note. This subclass contains, for example:

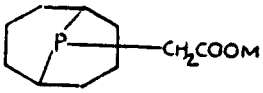




507 Alicyclic acids having an element other than oxygen, carbon, or hydrogen:
This subclass is indented under subclass 400. Compounds wherein the acid contains an alicyclic nucleus not provided for above and contains a covalently bonded element other than oxygen, carbon, or hydrogen, as for example, N, S, P, B or halogen.

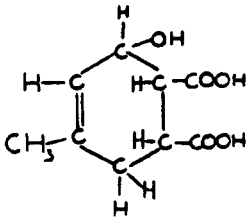
(1) Note. This subclass contains, for example:

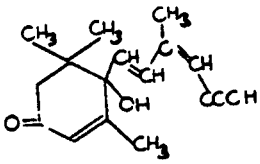




508 Alicyclic acids having an oxy, aldehyde, or ketone group:
This subclass is indented under subclass 400. Compounds wherein the acid contains an alicyclic nucleus not provided for above and contains the -OX group attached to a noncarbonylic carbon, where X is a non-carbonylic C, H, or an alcoholate forming group not provided for above; or a -C (=O) X group bonded to carbon, where X is C or H.

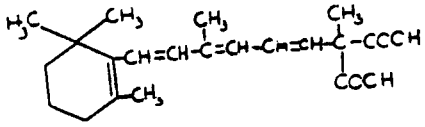
(1) Note. This subclass contains, for example:

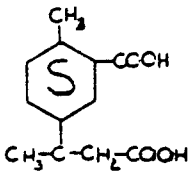




509 Alicyclic polycarboxylic acids:
This subclass is indented under subclass 400. Compounds wherein the acid contains an alicyclic nucleus not provided for above and contains more than one carboxyl group.

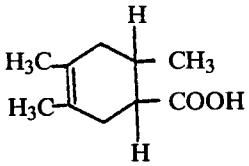
(1) Note. This subclass contains, for example:

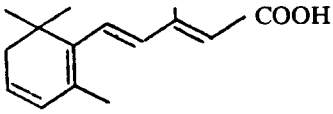




510 Alicyclic acids having unsaturation:
This subclass is indented under subclass 400. Compounds wherein the acid contains an alicyclic nucleus not provided for above and contains a double or triple bond.

(1) Note. This subclass contains, for example:



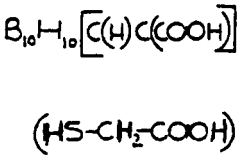


511 Naphthenic acids or salts thereof:
This subclass is indented under subclass 400. Compounds known as naphthenic acids derived from crude naphthene containing mineral oils and their salts.

512 Acyclic:
This subclass is indented under subclass 400. Compounds wherein the acid contains no carbocyclic nucleus.

(1) Note. Cyclic polyvalent metal salts of acyclic polycarboxylic acids are considered acyclic for this classification.

(2) Note. This subclass contains, for example:



SEE OR SEARCH CLASS:
562, Organic Compounds, subclasses 512.2+ for the production of acyclic carboxylic acids by partial oxidation of hydrocarbon mixtures.

512.2 Preparing by oxidation of hydrocarbon mixtures:
This subclass is indented under subclass 512. Processes for producing acyclic carboxylic acids by oxidizing a mixture of hydrocarbons.

512.4 Plural -COO- Groups in Compound Formed:
This subclass is indented under subclass 512.2. Processes wherein a compound having two or more -C(=O)O- groups is formed.

513 Preparation from source of undetermined composition (e.g., industrial waste, etc.):
This subclass is indented under subclass 512. Processes for producing acyclic carboxylic acids from sources of undetermined compositions, e.g., industrial wastes such as distillery slops, fermentation residues, and waste sulphite liquor. Examples of acids produced from these sources are acetic, oxalic, and glutamic acids and their salts.

(1) Note. This subclass also includes the production of betaine hydrochloride form residual liquors of the beet industry.

514 Nitrogen containing acid produced:
This subclass is indented under subclass 513. Processes wherein the acids produced contain nitrogen.

515 Preparation by degradation of carbohydrates:
This subclass is indented under subclass 512. Processes wherein the acids are produced by degradation of carbohydrates, e.g., paperpulp, sawdust, and sugars. Some of the acids produced are acetic, tartaric, lactic, and oxalic.

(1) Note. For the recovery of acetic acid from pyroligneous liquor (wood distillate), see subclasses 607+.

(2) Note. Reactions involving carbohydrates, other than degradation, are found in the appropriate subclasses provided therefor. For example, the production of acyclic carboxylic acids by oxidation of a monosaccharide are in subclasses 523+, especially in subclasses 527 and 531+. The reaction of glucose with HCN followed by hydrolysis to produce a polyoxy carboxylic acid is in subclass 587.

(3) Note. The oxidation of a polysaccharide to produce a carboxylate without degradation is in Class 536, Organic Compounds, in the appropriate subclasses.

516 Preparation by hydrolysis of proteins:
This subclass is indented under subclass 512. Processes wherein the acids are produced by the degradation of proteins such as gluten, casein, keratin, and zein.

(1) Note. This subclass also includes patents which claim the recovery of acids from protein hydrolysates without reciting the actual step of hydrolysis.

(2) Note. See subclass 554 for the purification or recovery of amino acids from sources other than protein hydrolysates.

SEE OR SEARCH CLASS:
426, Food or Edible Material: Processes, Compositions, and Products, subclasses 656+ for foods containing amino acids and processes for producing the same.

517 Preparation by carbonylation:
This subclass is indented under subclass 512. Processes wherein the acyclic carboxylic acid is produced through formation of a carboxyl group on an acyclic organic compound by reaction with carbon monoxide.

(1) Note. See subclasses 597 and 609 for carbonylation of inorganic compounds to produce oxalic and formic acids, respectively.

518 Of aldehyde or ketone:
This subclass is indented under subclass 517. Processes wherein the acid is produced by reacting an aldehyde or ketone with carbon monoxide.

519 Of alcohol or alcoholate:
This subclass is indented under subclass 517. Processes wherein the acid is produced by reacting an alcohol or alcoholate with carbon monoxide.

520 Of halogenated hydrocarbon:
This subclass is indented under subclass 517. Processes wherein the acid is produced by reacting a halogenated hydrocarbon with carbon monoxide.

521 Of hydrocarbon:
This subclass is indented under subclass 517. Processes wherein the acid is produced by reacting a hydrocarbon with carbon monoxide.

522 Group VIII Metal Containing Catalyst Utilized:
This subclass is indented under subclass 521. Processes wherein the carbonylation is carried out with a Group VIII metal catalyst.

(1) Note. The Group VIII metals includes Fe, Co, and Ni and the noble metals Ru, Rh, Pd, Os, Ir, and Pt.

523 Formation of carboxyl group by oxidation:
This subclass is indented under subclass 512. Processes wherein the carboxyl group of an acyclic acid is formed by oxidation.

(1) Note. The term "oxidation" as used here is identical with that set forth in subclass 407.

524 Of carboxylic acid or ester:
This subclass is indented under subclass 523. Processes wherein the acid is produced by oxidizing a carboxylic acid or ester.

525 Of oxy acid or ester:
This subclass is indented under subclass 524. Processes wherein the acid is produced by oxidizing an oxy acid or ester.

526 Of nitrogen containing compound:
This subclass is indented under subclass 523. Processes wherein the acid is produced by oxidizing a nitrogen containing compound.

527 Of ketone:
This subclass is indented under subclass 523. Processes wherein the acid is produced by oxidizing a ketone.

528 Cyclic ketone or mixture thereof with cyclic alcohol:
This subclass is indented under subclass 527. Processes wherein the acid is produced by oxidizing a cyclic ketone or a mixture of a cyclic ketone with a cyclic alcohol.

529 Two stage oxidation from hydrocarbon:
This subclass is indented under subclass 528. Processes wherein the acid is produced by oxidizing a hydrocarbon in a first state to produce a cyclic ketone or a mixture thereof with a cyclic alcohol, followed by a second stage oxidation of the first stage product to produce acyclic carboxylic acids.

530 With recycle or recovery of reaction component:
This subclass is indented under subclass 528. Processes wherein components of the reaction product are separated, further treated, or recycled to the reactor or recovered.

(1) Note. This subclass includes processes which claim a significant recovery step to produce the desired acyclic carboxylic acid or are directed to recovery or recycle of solvents, catalysts, or unoxidized starting materials.

531 Of aldehyde:
This subclass is indented under subclass 523. Processes wherein the acid is produced by oxidizing an aldehyde.

532 Producing unsaturated acid:
This subclass is indented under subclass 531. Processes wherein the acid produced is an unsaturated acyclic carboxylic acid.

533 Liquid phase oxidation:
This subclass is indented under subclass 532. Processes wherein the unsaturated acyclic carboxylic acid is produced by oxidation of an aldehyde in the liquid phase.

534 Group VIII Metal Containing Catalyst Utilized:
This subclass is indented under subclass 532. Processes wherein the unsaturated acid is produced by oxidizing an aldheyde utilizing a Group VIII metal containing catalyst.

535 Group V Metal Containing Catalyst Utilized:
This subclass is indented under subclass 532. Processes wherein the unsaturated acid is produced by oxidizing an aldehyde utilizing a Group V metal containing catalyst.

(1) Note. The Group V metals are V, Nb, Ta, Pa, As, Sb, and Bi.

536 Producing acetic acid:
This subclass is indented under subclass 531. Processes wherein the acid produced by oxidizing an aldehyde is acetic acid.

537 Of ether:
This subclass is indented under subclass 523. Processes wherein the acid is produced by oxidizing an ether including cyclic ethers.

538 Of alcohol:
This subclass is indented under subclass 523. Processes wherein the acid is produced by oxidizing an alcohol.

(1) Note. The production of an acyclic carboxylic acid by the oxidation of a phenol is in subclass 523.

539 Caustic oxidant:
This subclass is indented under subclass 538. Processes wherein the acid is produced by oxidizing an alcohol with caustic, such as sodium or potassium hydroxide.

540 Nitrogen containing oxidant:
This subclass is indented under subclass 538. Processes wherein the acid is produced by oxidizing the alcohol with a nitrogen containing oxidant such as nitric acid or the oxides of nitrogen.

541 Of halogenated hydrocarbon:
This subclass is indented under subclass 523. Processes wherein the acid is produced by oxidizing a halogenated hydrocarbon.

542 Of hydrocarbon:
This subclass is indented under subclass 523. Processes wherein the acid is produced by oxidation of a hydrocarbon.

543 Alicyclic:
This subclass is indented under subclass 542. Processes wherein the acid is produced by oxidizing an alicyclic hydrocarbon.

544 Olefin:
This subclass is indented under subclass 542. Processes wherein the acid is produced by oxidizing an olefin.

545 Producing unsaturated acid:
This subclass is indented under subclass 544. Processes wherein the acid produced by oxidizing an olefin is an unsaturated acyclic carboxylic acid.

546 Group VIII Metal Containing Catalyst Utilized:
This subclass is indented under subclass 545. Processes wherein the unsaturated acid is produced by oxidizing an olefin utilizing a Group VIII metal containing catalyst.

547 Group V Metal Containing Catalyst Utilized:
This subclass is indented under subclass 545. Processes wherein the unsaturated acid is produced by oxidizing an olefin utilizing a Group V metal containing catalyst.

548 Producing acetic acid:
This subclass is indented under subclass 544. Processes wherein the acid produced by oxidizing an olefin is acetic acid.

549 Alkane:
This subclass is indented under subclass 542. Processes wherein the acid is produced by oxidizing a saturated acyclic hydrocarbon.

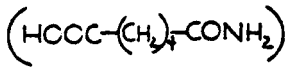
550 Formation of carboxyl group by carbonation:
This subclass is indented under subclass 512. Processes wherein an acyclic carboxylic acid is produced by reacting an acyclic compound with carbon dioxide or a material which will produce carbon dioxide under the reaction conditions, such as a carbonate.

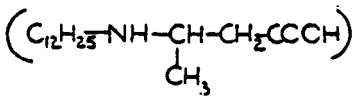
551 Of C-Metallated Compound:
This subclass is indented under subclass 550. Processes wherein the acid is produced by reacting a compound having a C-Metal bond with carbon dioxide.

552 Of alkali metal salt of carboxylic acid:
This subclass is indented under subclass 550. Processes wherein the acide is produced by reacting an alkali metal salt of a carboxylic acid with carbon dioxide.

553 Nitrogen bonded to carbon of organic radical (e.g., amino acids, etc.):
This subclass is indented under subclass 512. Compounds wherein the acid contains nitrogen bonded to a carbon of an organic radical.

(1) Note. This subclass contains, for example:





SEE OR SEARCH CLASS:
564, Organic Compounds, subclasses 67+ for processes of producing urea from carbon dioxide and ammonia wherein ammonium carbomate is also formed.

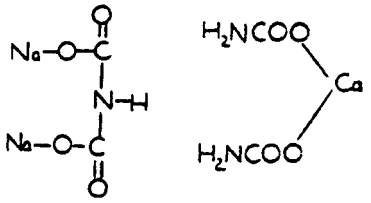
554 Purification or recovery, per se:
This subclass is indented under subclass 553. Processes directed to the purification, separation, or recovery of nitrogen containing acyclic carboxylic acids.

(1) Note. See subclasses 516 for purification or recovery of amino acids from protein hydrolysates.

(2) Note. See subclasses 401+ for the separation of optical isomers of nitrogen containing acyclic carboxylic acids.

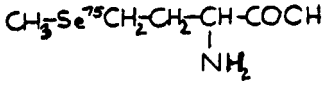
555 Carbamic acids or salts thereof:
This subclass is indented under subclass 553. Compounds wherein the acid contains nitrogen bonded directly to the carbon of a carboxyl group.

(1) Note. This subclass contains, for example:



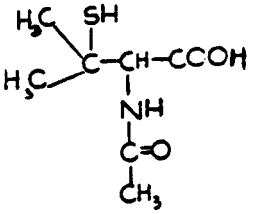
556 Sulfur or selenium:
This subclass is indented under subclass 553. Compounds wherein the acid contains covalently bonded sulfur or selenium:

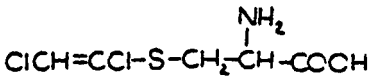
(1) Note. This subclass contains, for example:



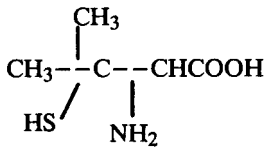
557 Alpha N, Beta S - Acids or Salts Thereof:
This subclass is indented under subclass 556. Compounds wherein the acid contains nitrogen attached to the alpha carbon and sulfur attached to the beta carbon relative to the carboxyl group.

(1) Note. This subclass contains, for example:

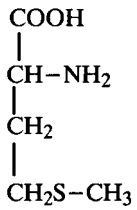




558 Penicillamine, per se, or salt thereof:
This subclass is indented under subclass 557. The compound which is penicillamine (see figure below) or its salts and processes for its preparation not provided for above.

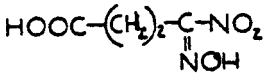


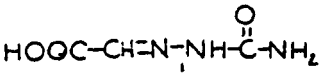
559 Methionine, per se, or salt thereof:
This subclass is indented under subclass 556. The compound which is methionine (see figure below) or its salts and processes for its preparation not provided for above.



560 Ureido, hydrazino, or nitrogen double bonded directly to carbon:
This subclass is indented under subclass 553. Compounds wherein the acid contains the ureido group (N-C (=O)- N), the hydrazino group (N - N), or the -C=N- group, such as the guanido or amidino groups or structures equivalent to those formed by reacting an aldehyde or a ketone with ammonia or an amine.

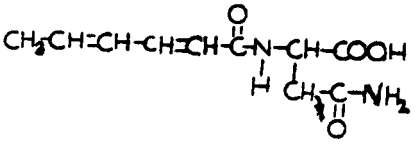
(1) Note. This subclass contains, for example:

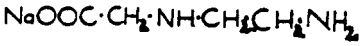




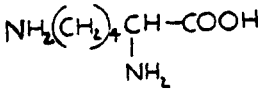
561 Plural nitrogens:
This subclass is indented under subclass 553. Compounds wherein the acid contains more than one nitrogen.

(1) Note. This subclass contains, for example:

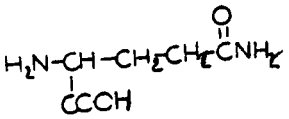




562 Lysine, per se, or salt thereof:
This subclass is indented under subclass 561. The compound which is lysine (see figure below) or its salts and processes for its preparation not provided for above.

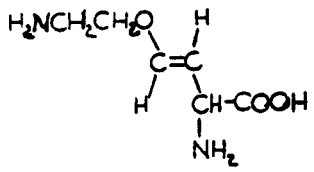


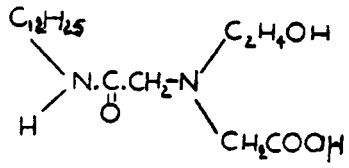
563 Glutamine, per se, or salt thereof:
This subclass is indented under subclass 561. The compound which is glutamine (see figure below) or its salts and processes for its preparation not provided for above.



564 Oxy containing:
This subclass is indented under subclass 561. Compounds wherein the acid contains an -OX group bonded to a noncarbonylic carbon, where X is a noncarbonylic carbon, H, or an alcoholate forming group not provided for above.

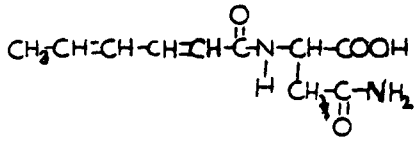
(1) Note. This subclass contains, for example:

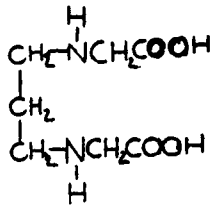




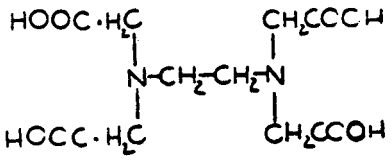
565 Polycarboxylic:
This subclass is indented under subclass 561. Compounds wherein the acid contains more than one carboxyl group.

(1) Note. This subclass contains, for example:



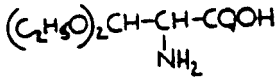


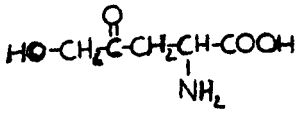
566 Ethylene diamine tetraacetic acid, per se, or salt thereof:
This subclass is indented under subclass 565. The compound which is ethylene diamine tetraacetic acid (figure below) or its salts and processes for its preparation not provided for above.



567 Oxy, aldehyde, or ketone:
This subclass is indented under subclass 553. Compounds wherein the acid contains an -OX group bonded to a noncarbonylic carbon not provided for above; or a -C (=O) X group bonded to carbon where X is C or H.

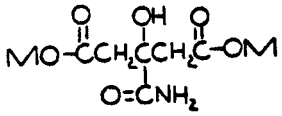
(1) Note. This subclass contains, for example:

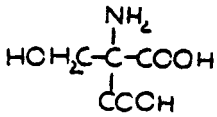




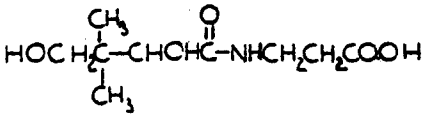
568 Polycarboxylic:
This subclass is indented under subclass 567. Compounds wherein the acid contains more than one carboxyl group.

(1) Note. This subclass contains, for example:

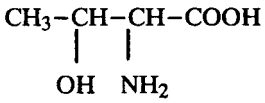




569 Panthothenic acid, per se, or salt thereof:
This subclass is indented under subclass 567. The compound which is panthothenic acid (see figure below) or its salts and processes for its preparation not provided for above.

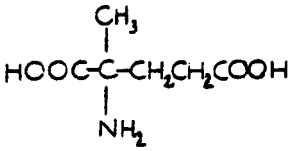


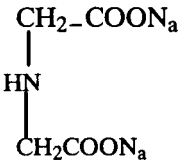
570 Threonine, per se, or salt thereof:
This subclass is indented under subclass 567. The compound which is threonine (see structure below) or its salts and processes for its preparation not provided for above.



571 Polycarboxylic:
This subclass is indented under subclass 553. Compounds wherein the acid contains more than one carboxyl group.

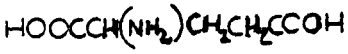
(1) Note. This subclass contains, for example:





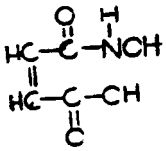
572 Nitrilotriacetic acid, per se, or salt thereof:
This subclass is indented under subclass 571. The compound which is nitrilotriacetic acid (i.e., structure below) or its salts and processes for its preparation not provided for above.

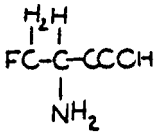
573 Glutamic acid, per se, or salt thereof:
This subclass is indented under subclass 571. The compound which is glutamic acid or its salts and processes for its preparation not provided for above.



574 Halogen or unsaturation:
This subclass is indented under subclass 553. Compounds wherein the acid contains covalently bonded halogen, or contains a double or triple bond.

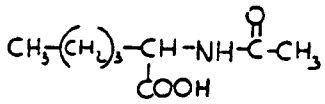
(1) Note. This subclass contains, for example:

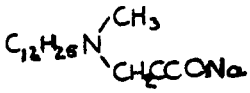




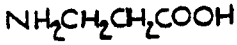
575 Alpha nitrogen:
This subclass is indented under subclass 553. Compounds wherein the acid contains nitrogen bonded to the carbon which is in the position alpha to the carboxyl group.

(1) Note. This subclass contains, for example:



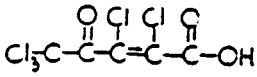


576 Beta alanine, per se, or salts thereof:
This subclass is indented under subclass 553. The compound which is beta alanine (see structure below) or its salts and processes for its preparation not provided for above.



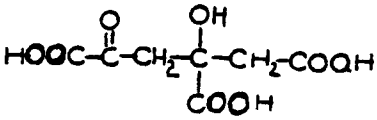
577 Aldehyde or ketone:
This subclass is indented under subclass 512. Compounds wherein the acid contains the group -C (=O) X bonded to carbon, where X is C or H.

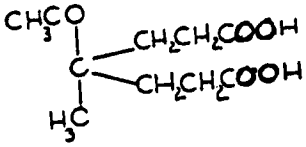
(1) Note. This subclass contains, for example:



578 Polycarboxylic:
This subclass is indented under subclass 577. Compounds wherein the acid contains more than one carboxyl group.

(1) Note. This subclass contains, for example:





579 Oxy:
This subclass is indented under subclass 512. Compounds wherein the acid contains an -OX group attached to a noncarbonylic carbon and X is a noncarbonylic C, H, or an alcoholate forming group not provided for above.

(1) Note. This subclass contains, for example:

580 Purification or recovery, per se:
This subclass is indented under subclass 579. Processes directed to the purification, separation, or recovery of an acyclic oxy carboxylic acid.

(1) Note. See subclass 515 for recovery of acyclic oxy carboxylic acids resulting from the degradation of carbohydrates.

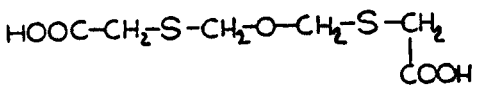
(2) Note. See subclasses 401+ for the separation of optical isomers of acyclic oxy carboxylic acids.

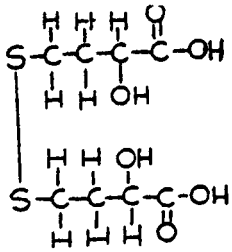
SEE OR SEARCH CLASS:

29, Metal Working, subclass 25.35 and the classes referred to in the search notes of that subclass for processes of and apparatus for the manufacture of piezoelectric crystals of Rochelle salt by procedures which include crystallizing and additional manufacturing operations.

581 Sulfur:
This subclass is indented under subclass 579. Compounds wherein the acid contains covalently bonded sulfur.

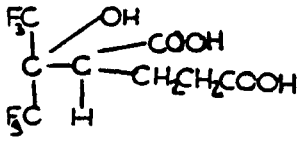
(1) Note. This subclass contains, for example:

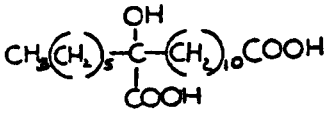




582 Polycarboxylic:
This subclass is indented under subclass 579. Compounds wherein the acid contains more than one carboxyl group.

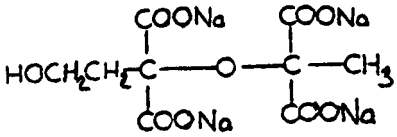
(1) Note. This subclass contains, for example:

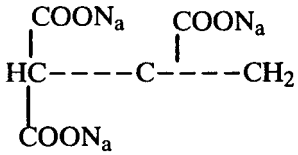




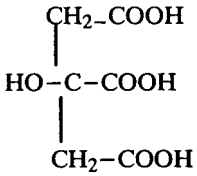
583 Ether:
This subclass is indented under subclass 582. Compounds wherein the acid contains the -OX group bonded to a noncarbonylic carbon, where X is a noncarbonylic carbon.

(1) Note. This subclass contains, for example:

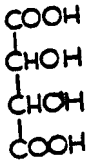




584 Citric acid, per se, or salt thereof:
This subclass is indented under subclass 582. The compound which is citric acid (structure below) or its salts and processes for its preparation not provided for above.



585 Tartaric acid, per se, of salt thereof:
This subclass is indented under subclass 582. The compound which is tartaric acid (structrue below) or its salts and processes for its preparation not provided for above.

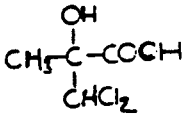


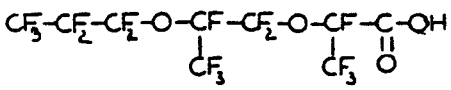
SEE OR SEARCH CLASS:

310, Electrical Generator or Motor Structure, subclasses 311+ for piezoelectric crystals of Rochelle salt where the shape is significant; and subclass 360 where the specific configuration or crystal axis is significant with respect to piezoelectric properties.

586 Halogen:
This subclass is indented under subclass 579. Compounds wherein the acid contains covalently bonded halogen.

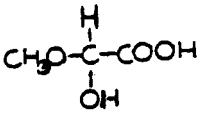
(1) Note. This subclass contains, for example:

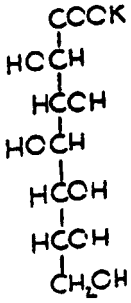




587 Polyoxy:
This subclass is indented under subclass 579. Compounds wherein the acid contains more than one oxy group.

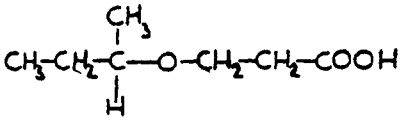
(1) Note. This subclass contains, for example:

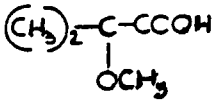




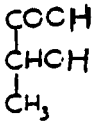
588 Alkoxy:
This subclass is indented under subclass 579. Compounds wherein the -OX group of the acids is bonded to the carbon of an alkyl group and X is a noncarbonylic carbon.

(1) Note. This subclass contains, for example:



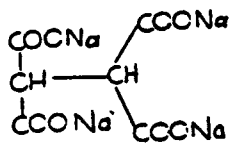


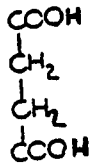
589 Lactic acid, per se, or salt thereof:
This subclass is indented under subclass 579. The compound which is lactic acid (structure below) or its salts and processes for its preparation not provided for above.



590 Polycarboxylic:
This subclass is indented under subclass 512. Compounds wherein the acid contains more than one carboxyl group.

(1) Note. This subclass contains, for example:





SEE OR SEARCH CLASS:

554, Organic Compounds, subclasses 1+, particularly subclass 166 for polycarboxylic acids derived by introducing additional carboxyl groups into higher fatty acids without cleavage.

591 Preparation by isomerization:
This subclass is indented under subclass 590. Processes wherein the acid is prepared by isomerization, as for example, the preparation of fumaric acid by isomerizing maleic acid.

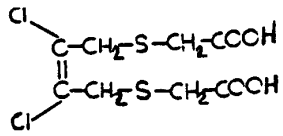
592 Preparation by hydrogenation:
This subclass is indented under subclass 590. Processes wherein the acid is produced by introduction of hydrogen.

593 Purification or recovery, per se:
This subclass is indented under subclass 590. Processes directed to the purification, separation, or recovery of acyclic polycarboxylic acids.

(1) Note. See subclasses 513 and 515 for purification or recovery of acyclic polycarboxylic acids from sources of undetermined compositions or from the degradation of carbohydrates, respectively.

594 Element Other Than C, H, O, N, or Halogen:
This subclass is indented under subclass 590. Compounds wherein the acid contains an element covalently bonded other than C, H, O, N, and halogen.

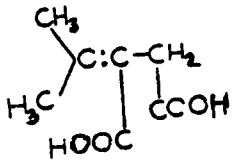
(1) Note. This subclass contains, for example:



$HOOC-CH_2-CH_2-S_e-S_e-CH_2-CH_2-COOH$

595 Unsaturated:
This subclass is indented under subclass 590. Compounds wherein the acid contains a double or triple bond.

(1) Note. This subclass contains, for example:



$HOOC.CH_2.C(COOH) = CH.COOH$

596 Halogen:
This subclass is indented under subclass 590. Compounds wherein the acid contains covalently bonded halogen.

(1) Note. This subclass contains, for example:

$$HOOC.\underset{Cl}{CH}.\underset{Cl}{CH}.\underset{Cl}{CH}.\underset{Cl}{CH}.COOH$$

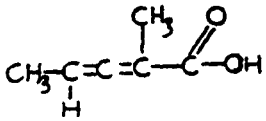
$HOOC-(CF_2)_4-COOH$

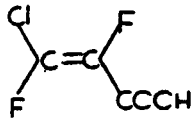
597 Oxalic acid, per se, or salt thereof:
This subclass is indented under subclass 590. The compound which is oxalic acid (see structure below) or its salts and processes for its preparation not provided for above.

HOOC.COOH

598 Unsaturated:
This subclass is indented under subclass 512. Compounds wherein the acid contains a double or triple bond.

(1) Note. This subclass contains, for example:





599 Formation of ethylenic unsaturation:
This subclass is indented under subclass 598. Processes wherein the acid is prepared by the introduction of a double bond.

600 Purification or recovery, per se:
This subclass is indented under subclass 598. Processes directed to the purification, separation, or recovery of acyclic unsaturated carboxylic acids.

601 Sorbic acid, per se, or salt thereof:
This subclass is indented under subclass 598. The compound which is sorbic acid (structure below) or its salts and processes for its preparation not provided for above.

602 Halogen:
This subclass is indented under subclass 512. Compounds wherein the acid contains covalently bonded halogen.

(1) Note. This subclass contains, for example: CH_2Br - CHBr - COOH, or

$CH_2Br - CHBr - COOH$

SEE OR SEARCH CLASS:
554, Organic Compounds, subclasses 225+ for halogenated higher fatty acids.

603 Preparation by halogenating acid or anhydride:
This subclass is indented under subclass 602. Processes wherein the acid is prepared by introducing halogen into an acyclic carboxylic acid or its anhydride.

604 Preparation by dehalogenation:
This subclass is indented under subclass 602. Processes wherein the acid is prepared by reducing the halogen content.

605 Fluorine containing:
This subclass is indented under subclass 602. Compounds wherein the acid contains covalently bonded fluorine.

(1) Note. This subclass contains, for example:

$CF_3(CF_2)_2(CH_2)_4S(CH_3)_2COOH$

CF_3-COOH

606 Saturated lower fatty acids:
This subclass is indented under subclass 512. Compounds wherein the acid contains a saturated, unsubstituted unbroken chain of not more than 6 carbon atoms attached to a carboxyl group.

(1) Note. This subclass contains, for example:

SEE OR SEARCH CLASS:
554, Organic Compounds, subclasses 1+ for higher fatty acids.

607 Acetic acid, per se, salt thereof:
This subclass is indented under subclass 606. The compound which is acetic acid or its salts and processes for its preparation not provided for above.

(1) Note. See subclass 536 for production of acetic acid by the oxidation of aldehydes; and subclass 548 for the oxidation of olefins.

608 Purification or recovery, per se:
This subclass is indented under subclass 607. Processes directed to the purification, separation, or recovery of acetic acid.

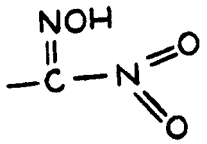
(1) Note. See subclass 513 for the recovery of acetic acid from sources of undetermined composition; and subclass 515 for the recovery of acetic acid resulting from degradation of carbohydrates.

(2) Note. See (1) Note (b) under subclass 400 for the placement of patents claiming the purification or recovery of an acid combined with a salt forming or salt hydrolysis step.

609 Formic acid, per se, or salt thereof:
This subclass is indented under subclass 606. The compound which is formic acid or its salts and processes for its preparation not provided for above.

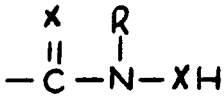
(1) Note. This subclass includes, for example, processes for preparing formic acid from carbon monoxide and water.

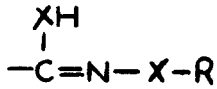
620 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein the hydrogen may be replaced by a Group IA or IIA light metal, or by substituted or unsubstituted ammonium:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408, and 409 for the chemical destruction of organic hazardous or toxic waste containing oxygen, nitrogen, and group IA or IIA light metals.

621 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain either of the following acid groups, in each of which the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium), the R's may be hydrogen or substitution for hydrogen, and H of -XH may be replaced by a Group IA or IIA light metal or by substituted or unsubstituted ammonium:

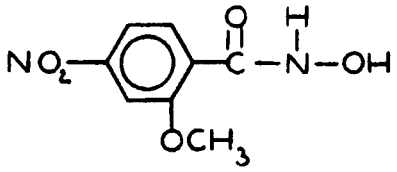


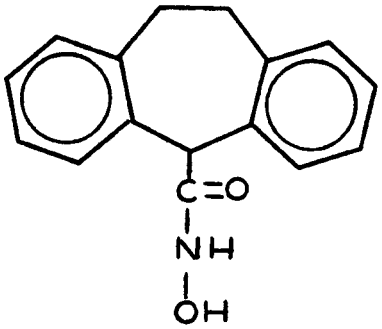


SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408, and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen, nitrogen, and group IA or IIA light metals.

622 This subclass is indented under subclass 621. Compounds wherein the carbon of the acid group is bonded directly to a carbocyclic ring.

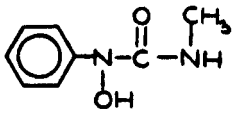
(1) Note. Examples of compounds provided for herein are:

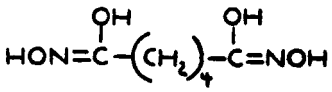




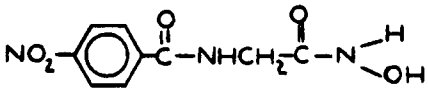
623 This subclass is indented under subclass 621. Compounds wherein the acid group is attached to nitrogen directly or indirectly by acyclic nonionic bonding.

(1) Note. Examples of compounds provided for herein are:





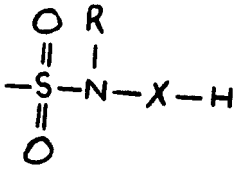
624 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium) and H of -XH may be replaced by a Group IA or IIA light metal or by substituted or unsubstituted ammonium:



SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen, nitrogen, the groups IA or IIA light metals.

625 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), R is hydrogen or substitution for hydrogen, and H of -XH may be replaced by a Group IA or IIA light metal, or by substituted or unsubstituted ammonium:

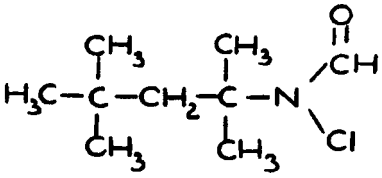


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 405, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen, nitrogen, the groups IA or IIA light metals.

800 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the -C(=X)-NH-halo group, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium), and substitution may be made for hydrogen only, i.e., hydroxamic acid halides or chalcogen analogs thereof.

(1) Note. An example of a compound provided for herein is:

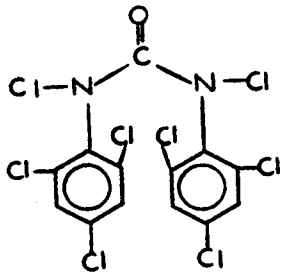


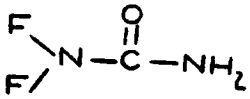
SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 406, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, chalcogen, or nitrogen.

801 This subclass is indented under subclass 800. Compounds wherein the -C(=X)- group is further bonded directly to an additional nitrogen.

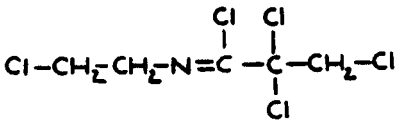
(1) Note. Examples of compounds provided for herein are:

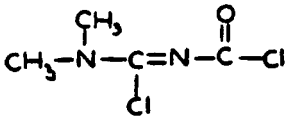




802 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the -N=CH-halo group, wherein substitution may be made for hydrogen only, i.e., imidic acid halides.

(1) Note. Examples of compounds provided for herein are:





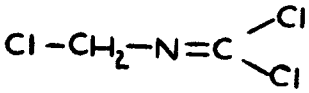
SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 406, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, chalcogen, or nitrogen.

803 This subclass is indented under subclass 802. Compounds wherein an additional halogen is bonded directly to the carbon of the imidic acid halide group, i.e., -N=C-(halo)2.

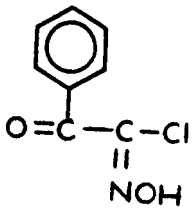
(1) Note. This subclass provides for the isocyanide dihalides.

(2) Note. An example of a compound provided for herein is:

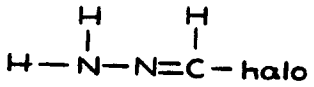


804 This subclass is indented under subclass 802. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is attached directly to the nitrogen of the imidic acid halide group by nonionic bonding (i.e., -X-N=CH-halo wherein substitution may be made for hydrogen only).

(1) Note. An example of a compound provided for herein is:

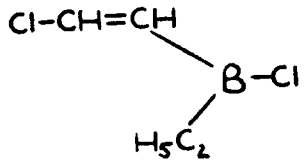


805 This subclass is indented under subclass 802. Compounds having the following formula, wherein substitution may be made for hydrogen only:



806 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein halogen is bonded directly to boron by nonionic bonding; i.e., boron halides.

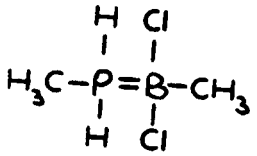
(1) Note. An example of a compound provided for herein is:

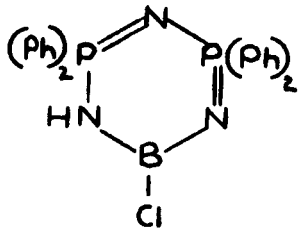


SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclass 408 for the chemical destruction of organic hazardous or toxic waste containing nitrogen or phosphorus.

807 This subclass is indented under subclass 806. Compounds in which phosphorus is attached directly or indirectly to the boron by nonionic bonding.

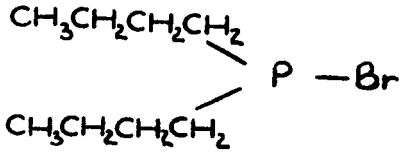
(1) Note. Examples of compounds provided for herein are:





808 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein halogen is bonded directly to phosphorus by nonionic bonding, i.e., phosphorus halides.

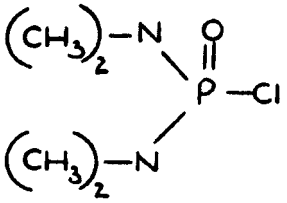
(1) Note. An example of a compound provided for herein is:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 406 and 408 for the chemical destruction of organic hazardous or toxic waste containing halogen, nitrogen, or phosphorus.

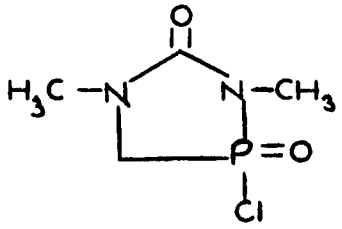
809 This subclass is indented under subclass 808. Compounds in which nitrogen is bonded directly to the phosphorus.

(1) Note. An example of a compound provided for herein is:



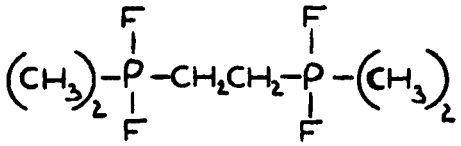
810 This subclass is indented under subclass 809. Compounds wherein both the phosphorus and the nitrogen are members of the same ring.

(1) Note. An example of a compound provided for herein is:



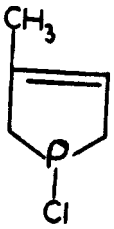
811 This subclass is indented under subclass 808. Compounds containing plural phosphorus atoms attached directly or indirectly to each other by nonionic bonding.

(1) Note. An example of a compound provided for herein is:



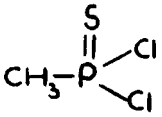
812 This subclass is indented under subclass 808. Compounds wherein the phosphorus is a member of a ring.

(1) Note. An example of a compound provided for herein is:



813 This subclass is indented under subclass 808. Compounds in which sulfur is bonded directly to the phosphorus.

(1) Note. An example of a compound provided for herein is:

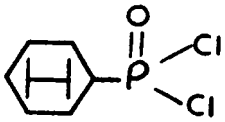


814 This subclass is indented under subclass 813. Processes which utilize an inorganic compound which contains phosphorus and sulfur in the preparation.

815 This subclass is indented under subclass 813. Processes whereby a phosphorus to carbon bond is formed.

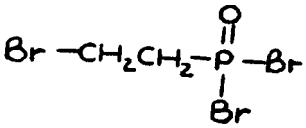
816 This subclass is indented under subclass 808. Compounds in which oxygen is bonded directly to the phosphorus.

(1) Note. An example of a compound provided for herein is:



817 This subclass is indented under subclass 816. Compounds wherein halogen is attached indirectly to the phosphorus by acyclic nonionic bonding.

(1) Note. An example of a compound provided for herein is:



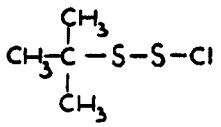
818 This subclass is indented under subclass 816. Processes whereby the phosphorus to halogen bond is formed.

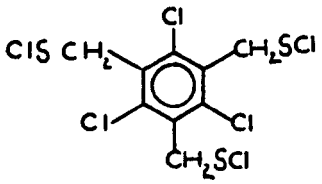
819 This subclass is indented under subclass 816. Processes whereby a phosphorus to carbon bond is formed.

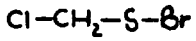
820 This subclass is indented under subclass 808. Processes whereby a phosphorus to carbon bond is formed.

821 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein halogen is bonded directly to sulfur by nonionic bonding: i.e., sulfur halides.

(1) Note. Examples of compounds provided for herein are:



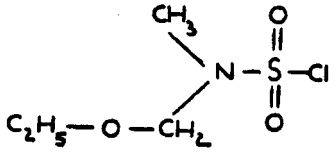


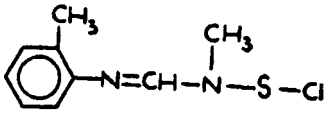


SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 406, 408, and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, chalcogen, or phosphorus.

822 This subclass is indented under subclass 821. Compounds in which nitrogen is bonded directly to the sulfur.

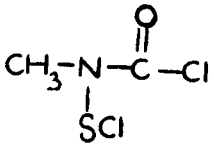
(1) Note. Example of compounds provided for herein are:

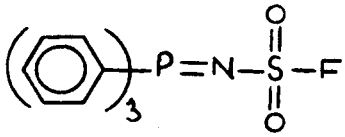


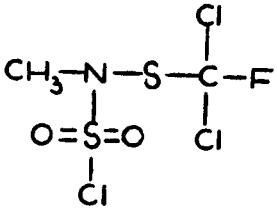


823 This subclass is indented under subclass 822. Compounds in which phosphorus, a -C(=X)- group, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium) or an additional chalcogen is attached directly to the nitrogen by nonionic bonding.

(1) Note. Examples of compounds provided for herein are:





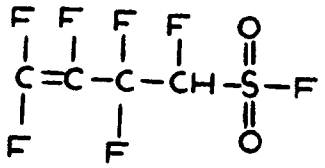


824 This subclass is indented under subclass 821. Compounds wherein the halogen is fluorine; i.e., sulfur fluorides.

(1) Note. An example of a compound provided for herein is:

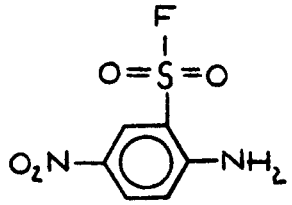
825 This subclass is indented under subclass 824. Compounds wherein chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is double bonded directly to the sulfur.

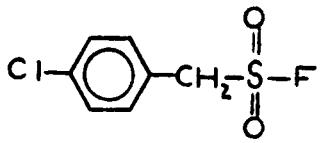
(1) Note. An example of a compound provided for herein is:



826 This subclass is indented under subclass 825. Compounds in which a benzene ring is attached directly or indirectly to the sulfur by nonionic bonding.

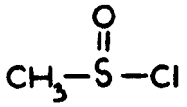
(1) Note. Examples of compounds provided for herein are:





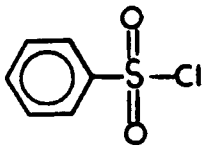
827 This subclass is indented under subclass 821. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) is double bonded directly to the sulfur (e.g., sulfinyl halides, etc.).

(1) Note. An example of a compound provided for herein is:



828 This subclass is indented under subclass 827. Compounds wherein plural chalcogens are double bonded directly to the sulfur (e.g., sulfonyl halides, etc.).

(1) Note. An example of a compound provided for herein is:

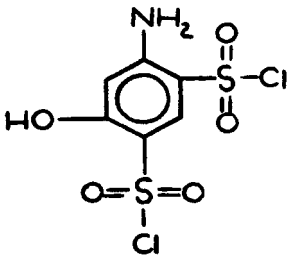


829 This subclass is indented under subclass 828. Processes in which elemental halogen is utilized.

830 This subclass is indented under subclass 828. Processes in which thionyl halide; i.e., halo-S(=O)-halo or a carbonyl dihalide; i.e., halo-C(=O)-halo is utilized.

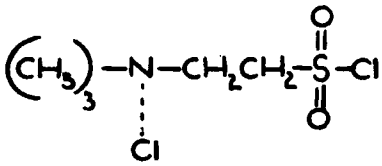
831 This subclass is indented under subclass 828. Compounds wherein at least two -S(=O)(=O)-halo groups are attached indirectly to each other by nonionic bonding.

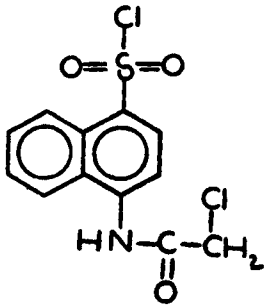
(1) Note. An example of a compound provided for herein is:



832 This subclass is indented under subclass 828. Compounds in which nitrogen, other than in a nitro or nitroso group, is attached indirectly to the sulfur by nonionic bonding.

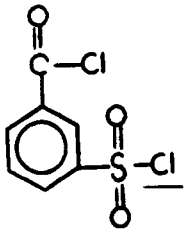
(1) Note. Examples of compounds provided for herein are:





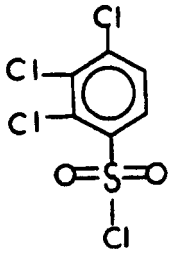
833 This subclass is indented under subclass 828. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) or nitrogen is attached indirectly to the sulfur by nonionic bonding.

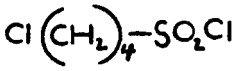
(1) Note. An example of a compound provided for herein is:



834 This subclass is indented under subclass 828. Compounds in which halogen is attached indirectly to the sulfur by nonionic bonding.

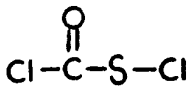
(1) Note. Examples of compounds provided for herein are:

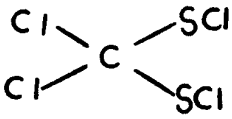


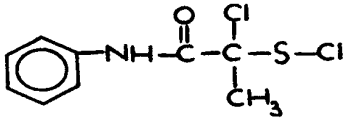


835 This subclass is indented under subclass 821. Compounds in which chalcogen (i.e., oxygen, sulfur, selenium or tellurium) or nitrogen is attached indirectly to the sulfur by nonionic bonding.

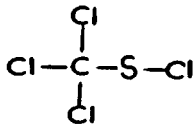
(1) Note. Examples of compounds provided for herein are:



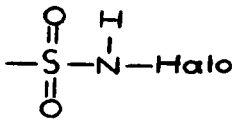




836 This subclass is indented under subclass 821. The compound which has the following structure:



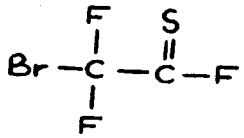
837 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, in which substitution may be made for hydrogen only:

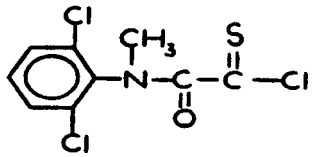


SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing sulfur, oxygen, or nitrogen.

838 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the -C(=S)-halo group, i.e., thiocarboxylic acid halides.

(1) Note. Examples of compounds provided for herein are:

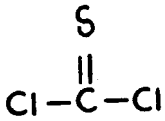




SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 406, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, sulfur, oxygen, or nitrogen.

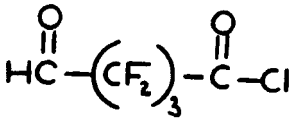
839 This subclass is indented under subclass 838. Compounds wherein plural halogens are bonded directly to the thiocarbonyl group (e.g., thiophosgene, etc.).

(1) Note. An example of a compound provided for herein is:



840 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the -C(=O)-halo group; i.e., carboxylic acid halide.

(1) Note. An example of a compound provided for herein is:

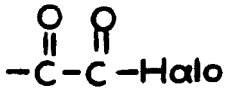


SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 406, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, oxygen, and nitrogen.

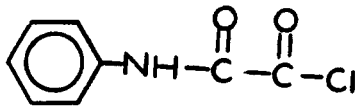
841 This subclass is indented under subclass 840. Products wherein the carboxylic acid halide containing compound is mixed with a preserving or stabilizing agent whose sole function is to prevent physical or chemical change.

842 This subclass is indented under subclass 840. Compounds wherein boron or phosphorus is attached directly or indirectly to the carbonyl group by nonionic bonding.

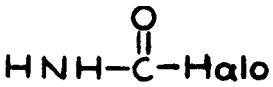
843 This subclass is indented under subclass 840. Compounds wherein an additional carbonyl group is bonded directly to the carbonyl of the carboxylic acid halide; i.e.,



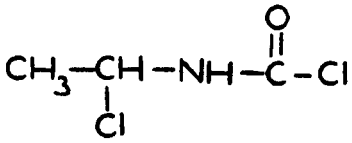
(1) Note. An example of a compound provided for herein is:



844 This subclass is indented under subclass 840. Compounds in which nitrogen is bonded directly to the carbonyl of the carboxylic acid halide; i.e., carbamyl halides of the following formula, wherein substitution may be made for hydrogen only:

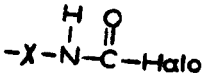


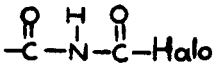
(1) Note. An example of a compound provided for herein is:



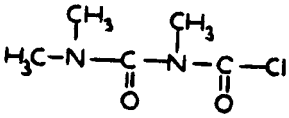
845 This subclass is indented under subclass 844. Compounds wherein chalcogen, X, (i.e., oxygen, sulfur, selenium or tellurium) or an additional carbonyl group is bonded directly to the nitrogen of the carbamyl halide; i.e., groups of the following formulas, wherein substitution may be made for hydrogen only:

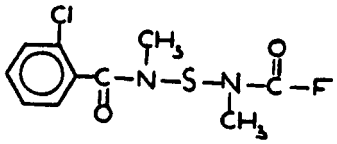
(1) Note. Examples of compounds provided for herein are:



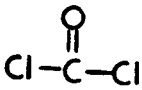


846 This subclass is indented under subclass 844. Processes wherein phosgene, i.e., the compound of the following formula, is used as a reactant:





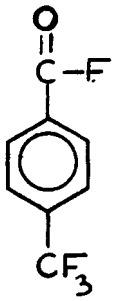
847 This subclass is indented under subclass 840. The compound which has the following structure:



848 This subclass is indented under subclass 840. Processes whereby carbon monoxide is utilized as a reactant, i.e., carbonylation reactions.

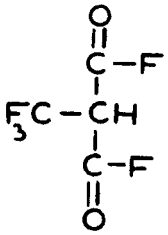
849 This subclass is indented under subclass 840. Compounds in which the halogen is fluorine; i.e., -C(=O)-F.

(1) Note. An example of a compound provided for herein is:



850 This subclass is indented under subclass 849. Compounds wherein plural -C(=O)-F groups are attached indirectly to each other by nonionic bonding.

(1) Note. An example of a compound provided for herein is:

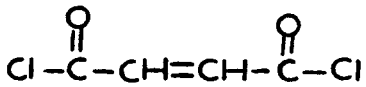


851 This subclass is indented under subclass 849. Processes whereby the carbonyl group, -C(=O)-, is formed.

852 This subclass is indented under subclass 849. Processes whereby the bond between the carbonyl group and the fluorine is formed.

853 This subclass is indented under subclass 840. Compounds wherein at least two -C(=O)-halo groups are attached indirectly to each other by nonionic bonding.

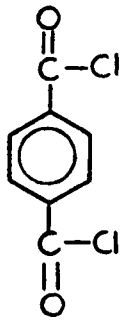
(1) Note. An example of a compound provided for herein is:



854 This subclass is indented under subclass 853. Processes which utilize phosgene in the preparation.

855 This subclass is indented under subclass 853. Compounds wherein at least two carbonyl groups are bonded directly to the same benzene ring.

(1) Note. An example of a compound provided for herein is:



856 This subclass is indented under subclass 840. Processes for the preparation of the carboxylic halide containing compounds or for the treatment of such compounds.

857 This subclass is indented under subclass 856. Processes wherein phosgene is utilized as a reactant.

858 This subclass is indented under subclass 856. Processes wherein a ketene reactant is utilized.

(1) Note. The structure of ketene is:

859 This subclass is indented under subclass 856. Processes whereby the -C(=O)- group is formed.

860 This subclass is indented under subclass 859. Processes wherein the carbonyl group is formed by the oxidation of a halogenated olefin.

861 This subclass is indented under subclass 856. Processes whereby the carbonyl to halogen bond is formed.

862 This subclass is indented under subclass 861. Processes wherein a reactant is utilized which has halogen bonded directly to sulfur by nonionic bonding.

863 This subclass is indented under subclass 861. Processes in which elemental halogen or hydrogen halide is utilized as a reactant.

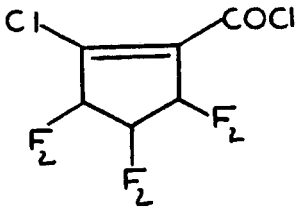
864 This subclass is indented under subclass 856. Processes whereby halogen is added to a compound.

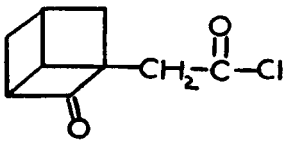
865 This subclass is indented under subclass 856. Processes whereby halogen, or hydrogen and halogen, are removed from a compound.

866 This subclass is indented under subclass 856. Processes wherein the carboxylic acid halide is separated from impurities or from the reaction medium.

867 This subclass is indented under subclass 840. Compounds which contain an alicyclic ring.

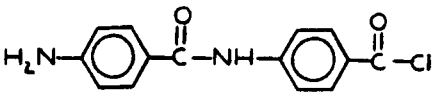
(1) Note. Examples of compounds provided for herein are:



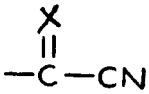


868 This subclass is indented under subclass 840. Compounds wherein nitrogen is attached indirectly to the carbonyl group by nonionic bonding.

(1) Note. An example of a compound provided for herein is:

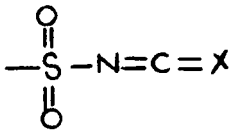


869 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium):



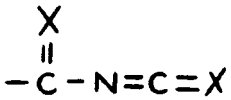
SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen or nitrogen.

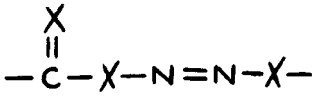
870 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein X is oxygen or sulfur:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing oxygen, sulfur, or nitrogen.

871 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain either of the following two groups, wherein the X's are the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium):

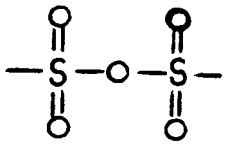




SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction

of organic hazardous or toxic waste containing chalcogen or nitrogen.

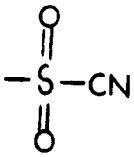
872 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group:

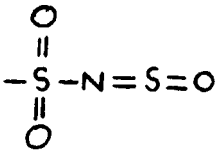


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclass 409 for the chemical destruction of organic hazardous or toxic waste containing oxygen or sulfur.

873 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain either of the following two groups:

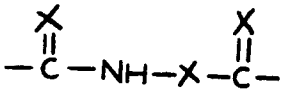


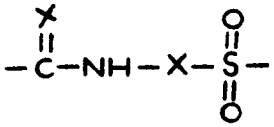


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing oxygen, sulfur, or nitrogen.

874 This subclass is indented under subclass 1. Compounds under Class 532 ... which contain either of the two following groups, wherein substitution may be made for hydrogen only, and the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium):

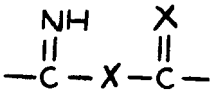




SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen or nitrogen.

875 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, wherein substitution may be made for hydrogen only, and the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium):

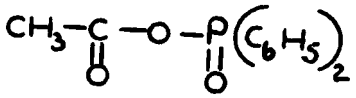


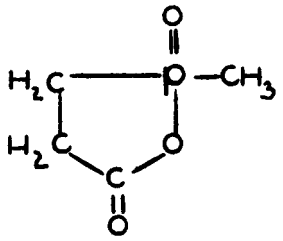
SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen or nitrogen.

876 This subclass is indented under subclass 1. Compounds under Class 532, ... in which the single bonded X of a -C(=X)X- group is bonded directly to phosphorus and the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. Examples of compounds provided for herein are:



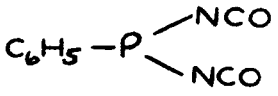


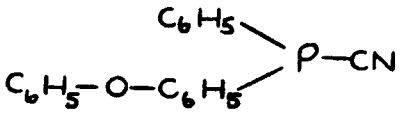
SEE OR SEARCH CLASS:

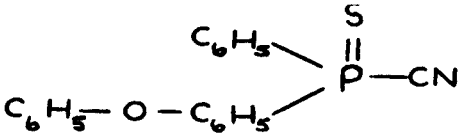
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen or phosphorus.

877 This subclass is indented under subclass 1. Compounds under Class 532, ... in which cyano or an -N=C=X group is bonded directly to phosphorus, and X is chalcogen (i.e., oxygen, sulfur, selenium or tellurium).

(1) Note. Examples of compounds provided for herein are:





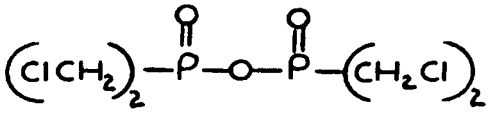


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen, nitrogen, or phosphorus.

878 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein a divalent chalcogen atom (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to two phosphorus atoms.

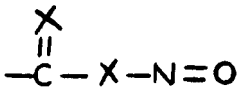
(1) Note. An example of a compound provided for herein is:

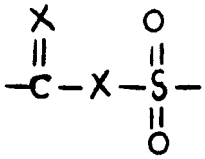


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclass 406, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen chalcogen or phosphorus.

879 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain either of the two following groups, in each of which the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium):

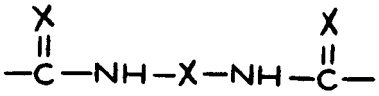


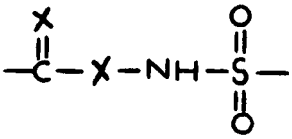


SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen or nitrogen.

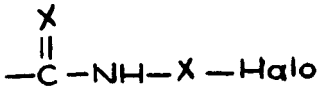
880 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain either of the two following groups, in each of which substitution may be made only for hydrogen and the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium):





SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment note subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen or nitrogen.

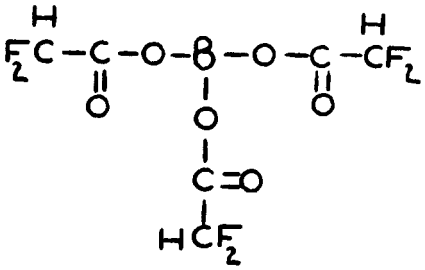
881 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, in which substitution may be made for hydrogen only, the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium), and halo is halogen:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen or nitrogen.

882 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein the single bonded X of a -C(=X)X- group is bonded directly to boron, and the X's may be the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium).

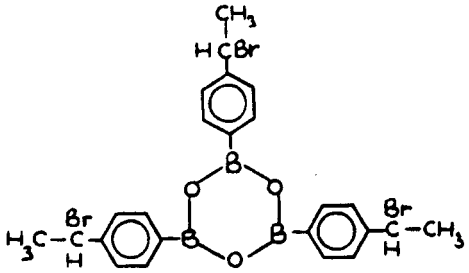
(1) Note. An example of a compound provided for herein is:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclass 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen.

883 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein a divalent chalcogen atom (i.e., oxygen, sulfur, selenium or tellurium) is bonded directly to two borons.

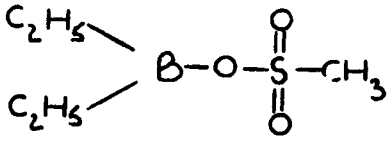
(1) Note. An example of a compound provided for herein is:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 406 and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen or chalcogen.

884 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein the single bonded oxygen of a -S(=O)(=O)-O- group is bonded directly to boron.

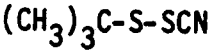
(1) Note. An example of a compound provided for herein is:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclass 409 for the chemical destruction of organic hazardous or toxic waste containing oxygen or sulfur.

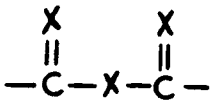
885 This subclass is indented under subclass 1. Compounds under Class 532, ... wherein carbon, which may be multiple bonded only to another carbon, is bonded directly to a -S-SCN group.

(1) Note. An example of a compound provided for herein is:



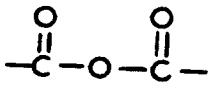
SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing sulfur or nitrogen.

886 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the following group, in which the X's are the same or diverse chalcogens (i.e., oxygen, sulfur, selenium or tellurium) and at least one X is sulfur:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclass 409 for the chemical destruction of organic hazardous or toxic waste containing chalcogen.

887 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain the carboxylic acid anhydride group:



SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclass 409 for the chemical destruction of organic hazardous or toxic waste containing oxygen.

888 This subclass is indented under subclass 887. Processes wherein the carboxylic acid anhydride group is formed.

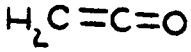
889 This subclass is indented under subclass 888. Processes wherein an aldehyde reactant is used.

890 This subclass is indented under subclass 888. Processes wherein carbon monoxide or a metal carbonyl is used as a reactant.

891 This subclass is indented under subclass 890. Processes wherein an ether or a carboxylic acid ester is used as a reactant.

892 This subclass is indented under subclass 888. Processes wherein a ketene or a ketone is used as a reactant.

(1) Note. The structure of ketene is:

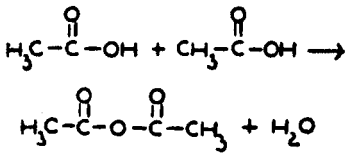


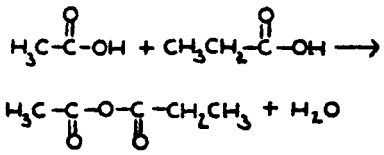
893 This subclass is indented under subclass 888. Processes wherein an ether or a carboxylic acid ester is used as a reactant.

894 This subclass is indented under subclass 888. Processes wherein a salt of a carboxylic acid is used as a reactant.

895 This subclass is indented under subclass 888. Processes which involve the dehydration of two like or different molecules of carboxylic acid.

(1) Note. Examples of processes provided for herein are:





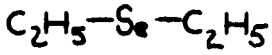
896 This subclass is indented under subclass 895. Processes wherein the dehydration is conducted in vapor phase.

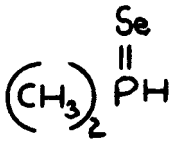
897 This subclass is indented under subclass 888. Processes wherein a carboxylic acid halide is used as a reactant.

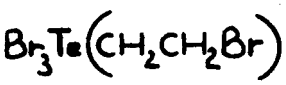
898 This subclass is indented under subclass 887. Processes wherein the carboxylic acid anhydride is separated from impurities or from the reaction mixture.

899 This subclass is indented under subclass 1. Compounds under Class 532, ... which contain selenium or tellurium.

(1) Note. Examples of compounds provided for herein are:







SEE OR SEARCH CLASS:

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 406, 408 and 409 for the chemical destruction of organic hazardous or toxic waste containing halogen, selenium, tellurium, or phosphorus.

END