

CLASS 521, SYNTHETIC RESINS OR NATURAL RUBBERS -- PART OF THE CLASS 520 SERIES

25

SECTION I - CLASS DEFINITION

This Class is directed to (a) ion-exchange polymers and process for their preparation, (b) processes of treating scrap or waste product containing solid organic polymer to recover a solid polymer therefrom, and (c) cellular products (such as foams, pores, channels, etc.) and processes of preparing such products. See Subclass References to the Current Class, below.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

The general line between this area and other areas of the Class 520 Series is that claims to preparing, treating, or to a porous or cellular product are considered as follows: (a) when a cellular containing product is inherently produced in a polymerization process (no control of process parameters so as to produce a cell containing product), then one must look to the specification to see if the use of the final cellular product is consistent with the use normally associated with a cellular product. If use is consistent with uses associated with a cellular product, classification is proper in this area; (b) when a cellular product is claimed which is the product of a noncellular-type polymerization process (e.g., bead, pearl, etc.) and wherein no later step is involved to introduce pores or any additional cell structure therein, then classification is as enumerated in (a) above.

SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 25, through 39, for ion-exchange polymers and process for their preparation.
 40, through 49.8, for processes of treating scrap or waste product containing solid organic polymer to recover a solid polymer therefrom.
 50, through 189, for cellular products (such as foams, pores, channels, etc.) and processes of preparing such products.

SUBCLASSES

ION-EXCHANGE POLYMER OR PROCESS OF PREPARING:

This subclass is indented under Class 520, subclass 1. Subject matter drawn to a solid ion-exchange polymeric material containing ionic groups exchangeable with other ionic groups.

- (1) Note. Included in this subclass are ion-exchange solid polymeric materials which are claimed as such or which are disclosed as having a utility as an ion-exchange polymer as well as processes of making such materials. Included in this class are polymeric materials, mixtures, and compositions which can be converted to ion-exchange materials by chemical reactions, processes of making such compositions, as well as mixtures of materials at least one of which is an ion-exchange material or is capable of forming an ion-exchange material and wherein the intent is to form an ion-exchange material. Also, this subclass includes amphoteric solid ion-exchange polymeric materials.
- (2) Note. The ionic groups can be acidic and/or basic groups thereby forming cationic, anionic or amphoteric ion-exchange polymeric materials. Typical cationic groups are: Sulfonic acid (-SO₃H), carboxylic acid (-COOH), hydroxyl (-OH), phosphonic (-PO₃H₂) groups and typical anionic groups are -NH₂, =NH, N groups as well as quaternary groups such as quaternary ammonium, sulfonium, phosphonium, arsonium, antimonium or hydrosulfide groups.
- (3) Note. In those subclasses indented herein under wherein only ion-exchange products are claimed and wherein the product claims fail to recite a mode of preparation, such products are to be classified on the basis of the disclosure as to the process of preparing the particular ion-exchange product.
- (4) Note. Purification of an ion-exchange polymer (A) to physically or chemically remove impurities therefrom (without

chemically modifying the polymer) is classified on the basis of the ion-exchange polymer (B) which is purified.

- (5) Note. The line between this subclass and Class 210 as well as the compound and compositions classes is as follows: (A) when a patent contains a claim to an ion-exchange polymer and also a claim to a process involving the mere treatment of a liquid therewith, even though the specific nature of the liquid is claimed, the patent is classified in Class 521 and cross-referenced to the appropriate treating class. If all the claims are drawn to a process of treating liquids with ion-exchange polymers, or any claim includes a significant treatment step, the patent is classified in the appropriate treating class and cross-referenced to this class (521) when necessary; (B) if a chemical reaction occurs so as to produce a new desirous material, then the patent is classified as an original in the class providing for that particular material, i.e., in the compound classes if a compound and in the composition classes if a new composition, with the proviso that if an organic compound proper for Class 260 is produced then that patent is still classified in this area and is cross-referenced into the appropriate organic compound area.

SEE OR SEARCH CLASS:

- 429, Chemistry: Electrical Current Producing Apparatus, Product, and Process, subclasses 306 through 320 for organic component containing compositions used as solid electrolytes in current producing cells and subclasses 492-494 for polymeric materials used as solid electrolyte membranes in fuel cells.

- 26 Process of regenerating:**
This subclass is indented under subclass 25. Subject matter directed to a used ion-exchange polymer which used ion-exchange polymer is subjected to a chemical treatment to effect regenerating to essentially its original ion-exchange polymeric form.

- (1) Note. Regenerating is meant to include chemical treatment of a used ion-exchange polymer thereby rendering the treated polymer to assume essentially its original ion-exchange polymeric form.
- (2) Note. Purification of a contaminated ion-exchange polymer by physical or chemical means is classified with the ion-exchange polymer purified.

SEE OR SEARCH CLASS:

- 523, Synthetic Resins or Natural Rubbers, subclasses 310+ for a process of forming a desirable composition of a polymer involving the use of ion-exchange or sorptive material or semi-permeable membrane in the process.
- 528, Synthetic Resins or Natural Rubbers, subclass 482 for the treatment of a polymer with an ion-exchange material to effect purification of the polymer.

27 Membrane or process of preparing:

This subclass is indented under subclass 25. Subject matter wherein the ion-exchange polymer is in the form of a membrane.

- (1) Note. By membrane is meant a thin sheet or film generally having some degree of permeability, and which may be homogeneous or heterogeneous in structure, and in the latter case the ion-exchange material is a component of a composition.

SEE OR SEARCH CLASS:

- 210, Liquid Purification or Separation, subclass 500.21, (2) Note for the lines between this class (521) and other classes with respect to membranes defined by composition.

28 Previously formed solid ion-exchange polymer admixed with nonreactive material or ion-exchange polymer:

This subclass is indented under subclass 25. Subject matter wherein a previously formed solid ion-exchange polymer is admixed with (1) a different ion-exchange polymer, or (2) with a material which is inert towards the ion-exchange polymer and wherein there is an

intent to form a desirous composition therewith.

- (1) Note. The material admixed with the ion-exchange polymer as in (2) above can include materials capable of becoming ion-exchange materials on further processing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

25+, for an admixture of an ion-exchange material and a material which is inert to the ion-exchange material and is intended to be removed in a later processing operation.

30+, for an admixture of an ion-exchange material and a reactant which is intended to chemically modify the ion-exchange polymer.

29 Polymer characterized by defined size or shape other than bead or pearl:

This subclass is indented under subclass 25. Subject matter wherein the ion-exchange polymer is characterized by having a defined size or shape.

- (1) Note. This subclass provides for (1) processes of producing ion-exchange polymers having defined shape or dimension, or (2) for ion-exchange polymer having a desired shape or dimension.
- (2) Note. Ion-exchange polymers having a defined shape produced by suspension polymerization (bead or pearl) are excluded from this subclass and are classified below on the basis of the particular reactants polymerized.
- (3) Note. Included in this subclass are ion-exchange polymers having defined geometric shape such as spherical, granular, filamental, etc.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, for a particular ion-exchange polymer having a defined dimension or for ion-exchange polymers having structure sufficient for placement in that class.

30 Chemically treated solid polymer:

This subclass is indented under subclass 25. Subject matter wherein a solid polymer is ionically modified by using a reactive chemical agent so as to form an ion-exchange polymer.

- (1) Note. Included in this subclass are chemical modifications of a preformed ionic polymer by ionic interchange, as well as modifications of ionic polymers by oxidation, reduction, hydrolyzation, saponification and the like.
- (2) Note. Patents are placed in this area on the basis of the original monomers that were reacted to produce a solid polymer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

31, for carboxylated polyacrylonitrile, an aftertreated product for which there is no specific indent subclass, because the original solid polymer (polyacrylonitrile) has been derived from only an ethylenically unsaturated reactant (acrylonitrile), and because the after-treatment involved no nitrogen or sulphur reactant.

33, for those instances where a polymer is initially carboxylated and then reacted with a sulphur material. This subclass also provides for a carboxylated polyacrylonitrile which is further treated with a sulphur material.

31 Solid polymer derived from ethylenically unsaturated reactant only:

This subclass is indented under subclass 30. Subject matter wherein the ion-exchange polymer is derived by the polymerization of only ethylenically unsaturated reactants.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, the Glossary, for a definition of the term "ethylenically unsaturated".

32 Treated with nitrogen-containing material:

This subclass is indented under subclass 31. Subject matter wherein the solid polymer is chemically treated with a nitrogen-containing material.

- (1) Note. The nitrogen-containing material usually renders the polymer anionic in character.
- 33 Treated with sulfur-containing material:**
This subclass is indented under subclass 31. Subject matter wherein the solid polymer is chemically treated with a sulfur-containing material.
- (1) Note. The sulfur-containing material usually renders the polymer cationic in character.
- 34 Solid polymer derived from at least one 1,2-epoxy containing reactant:**
This subclass is indented under subclass 30. Subject matter wherein the solid polymer is derived from a 1, 2-epoxy-containing reactant.
- (1) Note. Included in this class are alkylene oxides, epichlorhydrin and derivatives thereof.
- 35 Solid polymer derived from aldehyde or derivative:**
This subclass is indented under subclass 30. Subject matter wherein the solid polymer is derived from an aldehyde or derivative thereof.
- SEE OR SEARCH CLASS:
520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "aldehyde".
528, Synthetic Resins or Natural Rubbers, subclass 230, for a clarification of the term "aldehyde derivative."
- 36 Treated with nitrogen-containing material:**
This subclass is indented under subclass 35. Subject matter wherein the solid polymer is chemically treated with a nitrogen-containing material.
- SEE OR SEARCH CLASS:
525, Synthetic Resins or Natural Rubbers, subclasses 472+ for a chemical modification of a solid polymeric material derived from an aldehyde or derivative thereof.
- 37 Treated with sulfur-containing reactant:**
This subclass is indented under subclass 35. Subject matter wherein the solid polymer is chemically treated with a sulfur-containing material.
- SEE OR SEARCH CLASS:
525, Synthetic Resins or Natural Rubbers, subclasses 472+ for chemical modification of a solid polymer derived from an aldehyde or derivative thereof.
- 38 From ethylenically unsaturated reactant only:**
This subclass is indented under subclass 25. Subject matter wherein an ion-exchange polymer is derived from ethylenically unsaturated monomers only.
- 39 From aldehyde or derivative:**
This subclass is indented under subclass 25. Subject matter wherein an ion-exchange polymer is derived from an aldehyde or derivative thereof.
- SEE OR SEARCH CLASS:
520, Synthetic Resins or Natural Rubbers, the Glossary, for a definition of the term "aldehyde".
528, Synthetic Resins or Natural Rubbers, subclass 230 for a clarification of the term "aldehyde derivative".
- 40 PROCESS OF TREATING SCRAP OR WASTE PRODUCT CONTAINING SOLID ORGANIC POLYMER TO RECOVER OR PRODUCE A SOLID POLYMER THEREFROM:**
This subclass is indented under Class 520, subclass 1. Subject matter involving (a) process of recovery or producing solid organic synthetic polymer from polymeric scrap or waste product, or (b) process of preparing solid organic synthetic polymer from polymeric scrap or waste product by degradation of the polymeric scrap or waste product to monomer or low molecular weight prepolymer of a physically unseparated (i.e., nonfractionated) mixture thereof which is then reacted with another chemical species to generate another solid synthetic organic polymer.

- (1) Note. Only those patents with process claims of treating scrap or waste product of synthetic resins of the Class 520 Series type are classified herein. A patent with claims drawn to a process of reclaiming, recovering, or regenerating would be classified herein since it would inherently require a scrap or waste product. However, a patent with a claim drawn only to a process of separating would not be classified herein since a scrap or waste product is not inherently required. Process claims which require a reclaimed material are also classified herein, if the reclaimed material is of the type provided for by this class. For these patents the disclosure of how the material was reclaimed, if stated, and the claims themselves are used for the original classification. A patent which claims a process using an unclaimed scrap or waste product is classified herein only if the scrap or waste product is the sole disclosure in the specification. For example, a patent which claims a process of reacting component A with component B where component A is a phenolic resin and component B is either natural rubber, styrene-butadiene copolymer, or rubber tire waste product would not be classified (as an original) herein. However, if composition A was drawn only to rubber tire waste product, the patent would be classified herein.
- (2) Note. The terms "polymer" and "polymeric" refer either to homo- or copolymers.
- (3) Note. A process of recovering or producing refers to a process in which a non-workable polymeric scrap or waste product is converted to a workable (i.e., nonscrap or -waste) solid synthetic polymer.
- (4) Note. A process of recovering specifically refers to a process wherein the chemical bonds of the polymer in the polymeric scrap or waste product are not extensively broken, i.e., the molecular weight of the intermediate and final products are not substantially different from the molecular weight of the polymer contained in the scrap or waste product. Included under the definition of recovering is the process of treating a polymeric scrap or waste product with either a solid polymer or solid polymer forming system to produce a solid polymer containing material. Processes of recovering polymeric scrap or waste product by mere grinding, or grinding and mixing with another material, etc., are also placed herein.
- (5) Note. A process of producing specifically refers to the process wherein the chemical bonds of the polymer in the polymeric scrap or waste product are extensively broken, i.e., the molecular weight of the intermediate is substantially different from the molecular weight of the polymer contained in the scrap or waste product. Such low molecular weight oligomers or prepolymers are physically unseparated mixtures (see Note 7 below) and are then allowed to undergo further polymerization in order to obtain a solid synthetic organic polymer.
- (6) Note. A polymer scrap or waste product refers to a solid product which is unusable (or functionless) in its present form (i.e., without undergoing one of the three treatments above) due to at least one of a wide variety of impurities and/or undesirable constituent(s) or due to prevailing physical or chemical properties (e.g., degree of crosslinking, insolubility, etc.). Patents which employ only synonyms for scrap or waste product such as "by-product", "discard", "reject", etc., are classified herein provided they meet the above and below-stated requirements.
- (7) Note. A physically unseparated mixture refers to a desired degradation fragment consisting of a mixture of compounds, polymers, or other constituents which are reasonably known or are hypothesized. Patents relating to physically separated oligomers or low molecular weight prepolymers from degradation processes are excluded herefrom, regard-

less if they are or are not utilized in further polymerization processes.

- (8) Note. The polymeric scrap or waste product must contain a solid synthetic resin, to be classified herein. A process drawn to a polymeric scrap or waste product, where said polymeric scrap or waste product contains a mixture of a solid synthetic resin and a resin not normally classified in the Class 520 Series would be classified herein.
- (9) Note. A process drawn to treating a polymeric scrap or waste product to obtain a liquid product is excluded herefrom. However, if a liquid product is recovered which is polymerized in an additional step to produce a product proper for this class such subject matter would be proper for this subclass.
- (10) Note. A process drawn to treating a polymeric scrap or waste product to obtain a product containing a solid synthetic organic polymer normally found in this class along with a variety of other products, would be classified herein.
- (11) Note. A process related to the recovery of two or more polymers and/or prepolymers from a scrap or waste material containing two or more polymers and/or prepolymers is classified as an original under the polymer or prepolymer which appears first in the schedule below even if said polymer is not the desirable product to be recovered.
- (12) Note. A treating material is defined to be any material, reactant or nonreactant, which comes into contact with the scrap or waste product. Thus, a nonscrap or waste solid polymer may be a treating agent.
- (13) Note. A process related to the treatment of scrap or waste product with another material is classified with the first-appearing material in the schedule, regardless of the order performed.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 40, through 49.8, for a process of treating a scrap or waste product, where said scrap or waste product is a phenolic resin (such as a phenolformaldehyde, novolak, or resole) or is unspecified. for a process of treating a polymeric scrap or waste product to obtain a natural rubber (e.g., a process of treating a blend of natural and synthetic rubber to recover the natural rubber). and for processes only of treating scrap or waste products not for products of such processes.
- 42, for a synthetic rubber scrap product treated with a fluorinated alcohol to yield a reclaimed material which is mixed with an acrylonitrile-butadiene copolymer.
- 44, for a rubber scrap dissolved in methanol and then treated with polyethylene.
- 46.5, for treating a polyester scrap comprising a base layer of polyester and a sublayer of nondesirable polyvinyl chloride.

SEE OR SEARCH CLASS:

- 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, appropriate subclasses for a process of treating a polymeric scrap or waste product to obtain a nonresinous product or polymer having a special utility exemplified by Class 8.
- 106, Compositions: Coating or Plastic, appropriate subclasses for a process of treating a polymeric scrap or waste product, said scrap or waste product being a coating or plastic composition, such as an alkyd-modified resin.
- 241, Solid Material Comminution or Disintegration, appropriate subclasses for a process of comminution wherein the larger mass, before comminution is made up of a plurality of dissimilar materials, and following comminution and separation, the constituent parts of the same mass are recombined.
- 252, Compositions, appropriate subclasses for a process of treating a polymeric

- scrap or waste product to obtain a composition having a special utility proper for Class 252.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 37.1+ for processes of recycling of reclaimed virgin polymeric scrap or waste process material involving an operation proper for Class 264.
- 424, Drug, Bio-Affecting and Body Treating Compositions, appropriate subclasses for a process of treating a polymeric scrap or waste product to obtain a composition having a utility proper for Class 424.
- 523, Synthetic Resins or Natural Rubbers, subclass 129 for a process wherein a filler or nonreactive organic additive is obtained from municipal waste product which is then blended with a synthetic resin.
- 523, through 528, appropriate subclasses for products of the processes provided for in this class, subclasses 40 through 49.8 .
- 525, Synthetic Resins or Natural Rubbers, appropriate subclasses for a process of treating a polymeric scrap or waste product to obtain a physically separated solid oligomer or solid prepolymer which is then reacted with another material as an aftertreatment.
- 526, and 528, Synthetic Resins or Natural Rubbers, appropriate subclasses for a process of treating a polymeric scrap or waste product to obtain a physically separated liquid oligomer or liquid prepolymer which is then reacted with another material as an aftertreatment; or for products which are the result of a Class 521, subclasses 40+ process.
- 40.5 Process of treating scrap or waste product containing at least one polymer derived from ethylenic unsaturated monomers only:**
This subclass is indented under subclass 40. Subject matter wherein the scrap or waste product contains at least one polymer which is derived from only ethylenic unsaturated monomers.
- 41 Treating rubber (or rubberlike materials) or polymer derived from a monomer having at least two ethylenic unsaturated moieties:**
This subclass is indented under subclass 40.5. Subject matter wherein the scrap or waste product either contains rubber (or rubberlike materials) or is derived for a monomer having at least two points of ethylenic unsaturation.
- (1) Note. Included herein are processes of treating a polymeric scrap or waste product which is a mixture of two synthetic resins (e.g., polyacrylonitrile or poly (methyl) methacrylate) and a polymer derived for a monomer having at least two points of ethylenic unsaturation, etc.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
40.5, for a process of treating a polymeric scrap or waste product, said polymeric scrap or waste product being derived solely from a monoolefinic unit which is not provided for below (e.g., polyacrylonitrile, poly (methyl) methacrylate, etc.).
- 41.5 Treating with organic phosphorus-containing material:**
This subclass is indented under subclass 41. Subject matter wherein the process requires an organic phosphorus containing material.
- 42 Treating with organic nitrogen-containing material:**
This subclass is indented under subclass 41. Subject matter wherein the process requires an organic nitrogen-containing material.
- (1) Note. This subclass includes the use of an organic nitrogen-containing material as a solvent, catalyst, or other function.
- 42.5 Treating with organic chalcogen-containing material:**
This subclass is indented under subclass 41. Subject matter wherein the process requires an organic chalcogen-containing material.
- (1) Note. This subclass includes use of an organic chalcogen material as a solvent, catalyst, or other function.

- (2) Note. Chalcogen is defined to be any one (or combination) of the following oxygen, sulfur, selenium, or tellurium.
- 43 Containing organic sulfur:**
This subclass is indented under subclass 42.5. Subject matter wherein the organic chalcogen material contains sulfur.
- 43.5 Containing carboxylic acid or anhydride group:**
This subclass is indented under subclass 42.5. Subject matter wherein the organic chalcogen material is a carboxylic acid or the anhydride thereof.
- SEE OR SEARCH CLASS:
520, Synthetic Resins or Natural Rubbers, the Glossary for a definition of the term "carboxylic acid or derivative" which discusses the nature of, inter alia, carboxylic acids and anhydrides.
- 44 Containing hydroxyl group:**
This subclass is indented under subclass 42.5. Subject matter wherein the organic chalcogen material contains the hydroxyl moiety, -OH.
- (1) Note. This subclass includes alcohols, ROH, and phenols, ArOH.
- 44.5 Treating with hydrocarbon or halogenated hydrocarbon material:**
This subclass is indented under subclass 41. Subject matter wherein the process requires a hydrocarbon or a halogenated hydrocarbon.
- (1) Note. This subclass includes the use of a hydrocarbon or halogenated hydrocarbon as solvent.
- 45 Treating with steam or water:**
This subclass is indented under subclass 41. Subject matter wherein the process requires steam or water that has been substantially purified.
- (1) Note. A process which requires a 6N acid would not be classified herein but a process which requires a 6N acid followed by a spraying or washing of water would be classified herein.
- 45.5 Treating with mechanical action and in the absence of a chemically reactive additive or solvent:**
This subclass is indented under subclass 41. Subject matter wherein the process involves mechanical action and wherein chemical active materials or solvents are not utilized.
- (1) Note. Recovery of polymers solely by means of heat is considered to be mechanical action.
- (2) Note. Although chemically active materials and solvents have been excluded herefrom, chemically nonactive additives which may effect the process are included, e.g., dyes, fillers, pigments, etc.
- 46 Treating polymer derived from a monomer containing only carbon, hydrogen, and halogen or only carbon and halogen; or treating a polymer which has been derived from at least one hydrocarbon and which has been subsequently halogenated:**
This subclass is indented under subclass 40.5. Subject matter wherein the scrap or waste product contains a halogenated hydrocarbon.
- (1) Note. The sequence of obtaining the halogenated polymeric scrap or waste product, i.e., whether the halogenated polymer was obtained by polymerizing a halogenated monomer or by halogenating the polymer itself, is considered to be immaterial. Note, however, the polymeric scrap or waste product must be halogenated before the scrap or waste product is treated to recover or produce the solid polymer to be classified herein.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
41, for a process of treating a waste or scrap material where said waste or scrap material contains a halogenated hydrocarbon.

46.5 Treating polymer derived from vinyl chloride monomer:

This subclass is indented under subclass 46. Subject matter wherein the polymeric scrap or waste product is derived from at least one monomer which is vinyl chloride.

- (1) Note. Included herein would be a scrap or waste product either containing a mixture of polyethylene and polyvinyl chloride or a vinyl chloride-vinyl acetate copolymer.

47 Treating polymer derived from hydrocarbon monomers only:

This subclass is indented under subclass 40.5. Subject matter wherein the olefinic units (and hence the polymeric scrap or waste product) contain only carbon and hydrogen.

47.5 Treating polysiloxane:

This subclass is indented under subclass 40. Subject matter wherein the scrap or waste product contains polysiloxane.

48 Treating polyester:

This subclass is indented under subclass 40. Subject matter wherein the scrap or waste product contains a polyester whose polymer backbone was derived through the direct formation of the ester linkage, i.e., -O-, and must link through the carbonyl group.

- (1) Note. Polymerization of di- or higher esters of polycarboxylic acids, lactones, lactides, glycolide, hydroxy-substituted carboxylic acids or derivatives; or condensation of polyols with polycarboxylic acids or derivatives and polyketenes all produce polyesters proper for this subclass.
- (2) Note. A mere disclosure of a polyester in which the method of making said polyesters is not claimed or disclosed is presumed to lie within the definition of this subclass.

48.5 Treating with alcohol:

This subclass is indented under subclass 48. Subject matter wherein said polyester scrap or waste product is treated with an alcohol.

- (1) Note. This subclass includes the use of an alcohol as solvent.

49 Treating polyurethane, polyurea (excluding urea-formaldehyde polymers): polyisocyanurate or polycarbodiimide:

This subclass is indented under subclass 40. Subject matter wherein the scrap or waste product contains either a polyurethane, polyurea, polyisocyanurate, or a polycarbodiimide.

- (1) Note. A polyurethane is defined to be a polymer containing the moiety, -N- - O -, and is generally prepared for a polyisocyanurate and a polyol or from a bisaloforamate and a diamine.
- (2) Note. A polyurea is defined to be a polymer containing the moiety, -NN-, and is generally prepared from either a diamine and a dilsocyanate, a diamine and urea, a diamine and phosgene or a bisaloforamate and a diamine.
- (3) Note. A polyisocyanurate is defined to be a polymer containing the cyclic moiety shown below, and is generally derived from a polyisocyanate.
- $$\begin{array}{c} \text{O} \\ \diagup \quad \diagdown \\ \text{N} \quad \text{N} \\ \diagdown \quad \diagup \\ \text{O} \end{array}$$
- (4) Note. A polycarbodiimide is defined to be a polymer containing the moiety, -N=C=N-, and is generally defined from two or more polyisocyanates.
- (5) Note. A mere disclosure of a polyurethane, polyurea, polyisocyanurate or polycarbodiimide in which the method of making said polymer is not claimed or disclosed is presumed to lie within the definition of this subclass.

49.5 Treating with alcohol or amine:

This subclass is indented under subclass 49. Subject matter wherein said polymeric scrap or waste product is treated with an alcohol or amine.

- (1) Note. This subclass includes the use of an alcohol or amine as solvent.

49.8 Treating polycarbonamide:

This subclass is indented under subclass 40. Subject matter wherein the scrap or waste product contains a polycarbonamide.

- (1) Note. A polycarbonamide is defined to be a polymer containing either at least two or more N- units, e.g., nylon 6, nylon 6-6 or a polyimide unit, N, and is generally derived either from an amino carboxylic acid or derivative; a diamine and a dicarboxylic acid; or a dicarboxylic acid derivative, a diacid halide, and a diamine; or is derived from the condensation of lactams.
- (2) Note. A mere disclosure of a polycarbonamide in which the method of making said polycarbonamide is not claimed or disclosed is presumed to lie within the definition of this subclass.

50 CELLULAR PRODUCTS OR PROCESSES OF PREPARING A CELLULAR PRODUCT, E.G., FOAMS, PORES, CHANNELS, ETC.:

This subclass is indented under Class 520, subclass 1. Subject matter drawn to cellular products containing at least one solid synthetic polymer or to processes of preparing a cellular product containing at least a solid synthetic polymer.

- (1) Note. This subclass includes in addition to cellular products or processes of preparing same for (1) processes of preparing a composition which is capable of forming a cellular product upon exposure to heat or pressure, or to the composition, per se, or for (2) processes of treating a cellular product with a material which reacts with or forms a desired composition therewith, or purifies or treats in some other manner the cellular product and is not elsewhere provided for or cellular products thereof; or (3) processes of preparing a composition which is capable of forming a cellular product by removing a material therefrom without expansion of the composition or to the composition, per se.

- (2) Note. Included within the definition of cellular products are foamed products and products which contain pores, cavities, voids, interstices, or fissures.

- (3) Note. In order to be proper for this subclass, the final product must be a cellular product and must contain a solid synthetic polymer. Destruction of the cellular product as by grinding, etc., and wherein a noncellular solid polymer is recovered is excluded herefrom. Solid polymer as used throughout this schedule does not exclude polymers which would be solid except that under the conditions of use their physical state has been changed to satisfy the process conditions required (e.g., molten, dissolved).

- (4) Note. In order to be proper for this and the indented subclasses hereunder, those claims which recite a cell forming composition must recite that the composition has been perfected in some manner that is specific to the cellular property, e.g., adding a blowing agent, adding of cell stabilizing surfactants, etc. Compositions which are complete or nearly complete and which merely require the application of heat or the addition of air are proper for classification herein.

- (5) Note. The term "stated ingredient" denotes the intentional and deliberate presence of an ingredient (other than a monomer or reactant which forms the polymer backbone) during a cell forming process.

I. The term "stated ingredient" is limited to: (A) an amount of a material (e.g., 2 percent of a material, etc.); (B) (1) a recitation of at least one specified element in compound or in elemental form (e.g., oxygen-liberating compound, peroxy compound, chloride-containing, etc.) and (2) groups of elements which can be identified from the periodic table, other than metal or nonmetal (e.g., Group IA, transition metal, halogen-containing, etc.); (3) Compounds which have identified art meaning (e.g., alcohol, ethers, ester, etc.).

II. Examples of materials which are described in mere functional terms and are thereby excluded as being "stated ingredient" since they do not meet the parameters set out in I, A and B above are terms such as free radical catalyst, redox catalyst, emulsifier, dispersant, base, acid, organic medium, blowing agent, etc.

- (6) Note. Patents which claim an "in situ" preparation of the "stated ingredient" in the presence of the monomer or reactants which form the backbone polymer are classified on the materials which are introduced and co-react to form the "in situ" stated ingredient.
- (7) Note. Patents in this area are to be classified on the basis of the claimed final compound or composition that is introduced into the reaction zone and is in direct contact with any of the monomers or reactants therein. If it is not possible to so classify the introduced material, classification is then made on the basis of the individual reactants used in the preparation of the unknown material. In the event that the claims recite both the individual reactants and identify the product formed there from, then the original classification should be made in the subclass that provides for the known product and a cross-reference should be placed in the appropriate subclass that provides for the reactants.
- (8) Note. Claims to an after-treated product are classified on the basis of the actual monomers or reactants used in the preparation of the polymer to be after-treated rather than on the after-treated polymer, per se. Furthermore, polymers which are to be after-treated and which already have been exposed to a preliminary after-treatment step, (e.g., halogenated polymer, alkylated polymer, etc.) are classified on the basis of the unsaturated monomers or reactants used in the preparation of the polymer.
- (9) The types of cellular materials set forth in (A)-(F), infra, are provided for by this

class. (G)-(J), infra, provide further elucidation.

(A) A mixture of similar types or different types of solid polymers.

(B) A mixture of a solid polymer and a resinifiable intermediate condensation product, the latter being known to form a solid polymer under the conditions of the reaction if the performed solid polymer were not present.

(C) A mixture of a solid polymer and reactable materials, the latter materials being known to react to form a solid polymer under the conditions of the reaction if the preformed polymer were not present.

(D) A mixture of a solid polymer and a resinifiable intermediate, the latter combining with the solid polymer and polymerizing under the conditions of the reaction.

(E) A mixture of a solid polymer and reactable materials, the latter combining with the solid polymer and polymerizing under the conditions of the reaction.

(F) A mixture of a solid polymer and an ethylenic reactant.

(G) In (A) above any difference is sufficient to render the polymers nonidentical, even if both are made of the same monomeric materials. This includes, e.g., two polystyrenes of different density or crystallinity, two diene rubbers of different Mooney viscosity, etc.

(H) In general, reactable materials (or monomer), as used herein are distinguished from a resinifiable intermediate condensation product by the fact that the former is a definite compound of certain composition or structure, whereas the latter is the result of a reaction of one or more nonresinous materials to yield a product which is not a specific compound, but rather a complex mixture of products identifiable only on the basis of the average properties of the whole prod-

uct. Complex nonresinous materials which are known to react only by first breaking down to simple compounds are considered nonresinous materials (e.g., paraformaldehyde).

(I) Polymer forming system or polymer forming ingredients as used throughout the schedule are generic terms and include (1) reactable materials which form polymers, or (2) intermediate resinification condensation producers, polymers, or (3) ethylenic reactants which react with the polymer.

(J) The resinous, resinifiable or polymerizable reaction product of a plurality of nonresinous materials of any type is not included here, but is considered a copolymer or co-condensation product and placed in this class, as is appropriate.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 51, for processes of preparing a cellular product only.
- 52, for all subject matter pertinent to a reticulated product (e.g., processes, products, etc.).
- 53, through 55, for processes of treating, or for treated cellular products, or for compositions containing a cellular product and a treating agent, or processes of preparing such a composition.
- 56, through 77, for processes of preparing a cellular product for cell forming compositions or processes of preparing.
- 78, through 81, for processes of preparing a cellular product.
- 82, through 133, for processes of preparing a cellular product in the presence of a stated ingredient, for cell forming compositions containing a stated ingredient; or processes of preparing a cell forming composition.
- 134, through 189, for cellular products, for processes of preparing a cellular product in the absence of a stated ingredient, for a cell forming composition devoid of a stated ingredient or processes of preparing same, for processes of treating a cellular product

with a material which neither reacts with the cellular product nor which is intended to form a composition therewith.

SEE OR SEARCH CLASS:

- 106, Compositions: Coating or Plastic, for a synthetic pigment, filler or aggregate-containing voids or cavities and, in particular, subclass 409 wherein it is coated (encapsulated or dispersed) with a stated material.
- 216, Etching a Substrate: Processes, for etching processes used in the manufacturing of a porous or perforated article.
- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 4.1+ for liquid encapsulation, e.g., microencapsulating a liquid within a microcapsule wall derived from a synthetic polymer, etc. However, if the core material is disclosed to be an expanding (blowing) agent see Class 521, subclass 50, (4) Note for limitations to those subclasses.
- 427, Coating Processes, subclasses 213.3+ for solid encapsulation e.g., microencapsulating a solid with a microcapsule wall derived from a synthetic polymer, etc. However, if the core material is disclosed to be an expanding (blowing) agent see Class 521, subclass 50, (4) Note for limitations to those subclasses.
- 428, Stock Material or Miscellaneous Articles, subclasses 402.2+ and 402.24 for microcapsules with liquid and solid cores respectively. However, if the core material is disclosed to be an expanding (blowing) agent see Class 521, subclass 50, (4) Note for a limitation to those subclasses.
- 523, Synthetic Resins or Natural Rubbers, in particular, subclass 218 for a hollow nonsynthetic polymeric or polymeric or hollow nonpolymeric material in admixture with a polymer of that class.
- 525, Synthetic Resins and Natural Rubbers, for mixtures of solid polymers and mixtures of a solid polymer and a polymer forming system which mixtures are not cellular.

588, Hazardous or Toxic Waste Destruction or Containment, subclass 255 for the use of a polymer, resin, or foam in the containment of hazardous or toxic waste.

50.5 Compositions to be polymerized by wave energy in order to prepare a cellular product wherein said composition contains a rate-affecting material; or compositions to be modified by wave energy to prepare a cellular product wherein said composition contains a rate-affecting material; or processes of preparing or treating a solid polymer utilizing wave energy in order to prepare a cellular product:

This subclass is indented under subclass 50. Subject matter under Class 521, ... including one of the following: (a) processes of polymerizing a monomer to form a cellular solid polymer in the presence of wave energy; (b) processes of reacting a cellular solid polymer with a chemical reactant in the presence of wave energy in order to produce a modified polymer; (c) processes of treating a cellular solid polymer with wave energy wherein the wave energy causes a chemical reaction to precede; (d) polymerizable compositions to be treated with wave to form a cellular product wherein a photoinitiator or photosensitizer is or either specifically or nominally.

- (1) Note. To be classified herein the composition to be polymerized or reacted must have a photoinitiator photosensitizer claimed in addition to the polymer to be treated or the monomers to be polymerized.

51 Processes of preparing a cellular product having an integral skin:

This subclass is indented under subclass 50. Subject matter involving a process of preparing a cellular product having an integral skin.

- (1) Note. An integral skin is defined as a surface layer of increased density as compared with a central core or layer, and which skin is formed contemporaneously with the central core or layer and from the same cell forming ingredients.

SEE OR SEARCH CLASS:

- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 45.1+ for multi-step processes of forming cellular product having an integral skin, or for processes of forming a product having an integral skin involving a significant molding or shaping step.
- 428, Stock Material or Miscellaneous Articles, in particular subclasses 212+ and 304.4+ for a cellular product having an integral skin.

52 Reticulated cellular product or processes of preparing a reticulated cellular product:

This subclass is indented under subclass 50. Subject matter involving a reticulated cellular product.

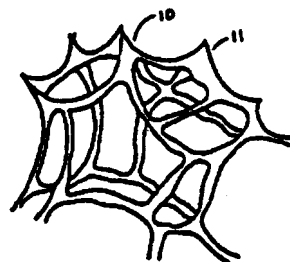


Figure 1 (reticulated)

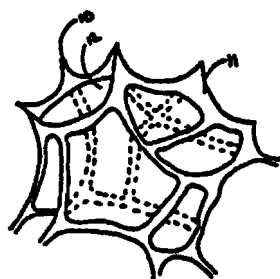


Figure 2 (nonreticulated); Number 10 is the polymer product; Number 11 is the skeletal structure.; Number 12 is the cell membrane.

- (1) Note. This subclass provides for all inventions not elsewhere provided, drawn to a reticulated product other than where the reticulated product is subsequently destroyed.

(2) Note. A reticulated cellular product is one which corresponds to a closed cell structure but wherein the cell windows have been substantially removed. An example of a reticulated product is illustrated above.

(3) Note. The reticulated product may be the result of a direct cell forming process or may be the result of the after-treating of a previously formed cellular product.

53 Treating a cellular solid polymer by adding a material thereto which reacts with the polymer or forms a composition therewith, or products of said treating process:

This subclass is indented under subclass 50. Subject matter wherein a previously formed solid cellular polymer is treated with a material so as to form a desired composition therewith or so as to chemically modify the cellular product by a change in chemical bonds therein.

(1) Note. Excluded from this subclass and the indented subclasses thereunder is the addition of a foaming agent to a partially expanded product.

SEE OR SEARCH THIS CLASS, SUBCLASS:

56+, for the addition of a foaming agent to a partially expanded bead.

134, through 189, for processes of purifying a cellular product by the addition of material thereto or for processes of treating with a material wherein no chemical reaction with the cellular product or desired composition with the cellular product is produced (e.g., contacting with a particular drying gas, etc.).

54 Treating a cellular solid polymer by adding a solid polymer or solid polymer-forming composition:

This subclass is indented under subclass 53. Subject matter wherein (1) an additional solid polymer is added to the previously formed cellular polymer, or (2) wherein polymer-forming ingredients are added to the previously formed solid cellular polymer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

50, (9) Note therein, for definition of the terms incorporated by (1) and (2) above.

55 Treating a cellular solid polymer by adding a material thereto which forms a composition therewith:

This subclass is indented under subclass 53. Subject matter wherein a material is added to the previously formed solid cellular material so as to form a desired composition therewith.

SEE OR SEARCH CLASS:

252, Compositions, subclass 567 for a web or sheet, e.g., of porous polymer, impregnated with a defined liquid dielectric.

56 Particle which is expandable, process of preparing an expandable particle, or process of expanding a particle to form a cellular product:

This subclass is indented under subclass 50. Subject matter wherein a cellular product is produced from a particle.

(1) Note. This subclass provides (1) for processes of forming a cellular product from an expandable particle; (2) for a particle which is claimed as being capable of forming a cellular product; or (3) for processes of preparing a particle which is capable of being formed into a cellular product.

(2) Note. This subclass does not require that the continuous phase of the particle be a solid synthetic polymer. It is sufficient if the particle merely contains a solid synthetic polymer.

(3) Note. This subclass requires that the particle nature be retained in the final cellular product and not be destroyed during or prior to the cell-forming step, e.g., melting particles for extruding is excluded herefrom, etc.

(4) Note. This subclass includes the process of treating a preexpanded particle so as to subsequently expand said particle.

- (5) Note. Also search appropriate subclasses for a sintering sheet having structure insufficient for placement into Class 428.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

79, for processes of forming a cellular product from particles which are either completely or partially melted during extrusion. The term "extrusion", per se, connotes destruction of the particulate structure unless the disclosure indicates to the contrary.

82+, for forming a cellular product from bulk handled particulate material whose particulate nature is destroyed prior to or during the cell-forming step.

SEE OR SEARCH CLASS:

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for a process of agglomerating or sintering wherein a sheet product may be formed having voids therein.

427, Coating Processes, for processes involving more than the mere coating of a particulate material and wherein said particulate material is nonexpandable.

428, Stock Material or Miscellaneous Articles, for mere processes of coating and for coated particles which are non-expandable.

57 Including step of surface coating a particle or process of expanding a surface coated particle:

This subclass is indented under subclass 56. Subject matter wherein (1) a particle of a solid polymeric material is surface coated and wherein the particle or the coating is expandable or is expanded in a later processing step; or (2) a particle is coated with a polymeric containing material and the base or coating is expandable or expanded in a later processing step.

- (1) Note. The coating may be continuous or discontinuous. It may be formed from a solid as in a powder coating or may be formed from a fluent.

- (2) Note. The surface coating may be applied precedent to or subsequent to a step of impregnating a particle with a blowing agent.

58 Expanding utilizing plural expansions steps:
This subclass is indented under subclass 56. Subject matter wherein the expansion steps occur in a plurality of stages.

- (1) Note. A continuous expansion step is not considered as being a "plurality of stages" and is properly classified elsewhere.

59 Expandable system contains two or more solid polymers or at least one solid polymer and at least one polymer-forming system:

This subclass is indented under subclass 56. Subject matter wherein two or more solid polymers are present during the cell-forming operation, or wherein, in addition to the solid particulate polymer, additional polymer-forming ingredients are present.

- (1) Note. This subclass includes "block" or "graft" copolymers.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

50, the (9) Note therein, for a discussion of the terms "two or more solid polymers or polymer-forming ingredients".

60 Adding expanding agent subsequent to solid polymer formation:

This subclass is indented under subclass 56. Subject matter wherein the expanding agent is added to a previously formed solid polymer, e.g., impregnating a particle with a blowing agent, etc.

61 Process of preparing a cellular product by removal of material from a solid polymer-containing matrix without expanding the matrix; composition which is nonexpandable and is designed to form a cellular product by said process; or process of preparing said composition:

This subclass is indented under subclass 50. Subject matter wherein a cellular product is produced by removing a material from a poly-

meric composition containing a solid polymer and wherein removal is accomplished without the composition being expanded.

- (1) Note. This subclass provides for (1) processes of forming a cellular product by removal of a material from a previously formed solid polymer composition; or (2) a solid polymer containing composition which is claimed as being capable of preparing a cellular product by removal of material therefrom; or (3) processes of preparing the composition of (2) above.
- (2) Note. In general, the operations proper for this subclass are characterized as leaching, extracting, evaporation, etc.
- (3) Note. Two step processes wherein an additional cell-forming operation is accomplished subsequent to the removal operation are proper herein unless an additional material is added subsequent to the removal which reacts with the polymer or forms a desired composition therewith.
- (4) Note. Processes involving a temporary base wherein a polymeric composition is placed on a temporary base and where the base is merely used as a work holder and is subsequently removed after the cell-forming operation of the polymeric composition are proper for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 53+, for two-step processes (1) wherein an additional cell-forming operation is accomplished subsequent to the removal operation, and (2) an additional material is added subsequent to the removal which reacts with the polymer or forms a desired composition therewith.

SEE OR SEARCH CLASS:

- 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 41+ for a process claim involving preparing a cellular article by removal of material from a sheet, film, or oriented or stretched fiber. Terms in claims such as forming a

“mass”, “forming an article”, “forming a desired shape”, or “shaping in a mold to provide a product of desired shape” preparatory to the removal operation are considered insignificant process limitations and such claims are proper for Class 521.

- 427, Coating Processes, for a process of permanently coating a base and removing material from the coating, from the base, or from both, to produce a cellular product.

62 **Mixture of solid polymers present during cell formation:**

This subclass is indented under subclass 61. Subject matter wherein two or more polymers are present during the cell-forming operation.

- (1) Note. This subclass includes “block” or “graft” copolymers.
- (2) Note. One of the polymers may be formed “in situ”.
- (3) Note. One of the polymers may be partially or completely removed during the cell-forming operation.

63 **Cellular product-forming process wherein the removable material is present or is produced in situ during the solid polymer formation step:**

This subclass is indented under subclass 61. Subject matter wherein the material removed to form the cellular structure is present during the solid polymer formation or is formed during the polymer-forming process.

64 **Removing a liquid to form a cellular product:**

This subclass is indented under subclass 61. Subject matter wherein the material removed to form the cellular structure is at least in part a liquid, e.g., extraction, evaporation, etc.

65 **Process of forming a cellular product from an aqueous latex, aqueous dispersion, aqueous emulsion containing a solid polymer; process of preparing a latex, dispersion, or emulsion containing a solid polymer which**

is designed to be formed into a cellular product, or composition thereof:

This subclass is indented under subclass 50. Subject matter wherein a cellular product is produced from an aqueous latex, aqueous dispersion, or aqueous emulsion containing a solid polymer.

- (1) Note. This subclass provides (1) for processes of forming a cellular product from an aqueous latex, aqueous emulsion, or aqueous dispersion containing a solid polymer; (2) for an aqueous latex, aqueous dispersion, or aqueous emulsion, of a preformed solid polymer which is claimed as being capable of preparing a cellular product; or (3) for processes of preparing an aqueous latex, aqueous emulsion, or aqueous dispersion which is capable of being formed into a cellular product, e.g., polymerizing a material and forming a polymer containing latex thereby and subsequently treating to form a cellular product, etc.
- (2) Note. Excluded from this area are processes involving preparing a latex, emulsion, or dispersion which is destroyed as by coagulation, precipitation or any other manner prior to the cell-forming step.

66 Treating a latex, dispersion, or emulsion containing a solid polymer at 32° f. or below, e.g., freezing, etc.:

This subclass is indented under subclass 5. Subject matter wherein a step is included of treating the aqueous latex, aqueous emulsion, or aqueous dispersion at a temperature of 32°F. or below.

- (1) Note. Included herein are coagulation or agglomeration by freezing of an aqueous latex, emulsion, or dispersion, or the addition of materials which are at or below 32°F. to an aqueous latex, dispersion, or emulsion.
- (2) Note. The treating for purposes of this subclass must integrally involve the aqueous latex, aqueous dispersion, or aqueous emulsion.

67 Adding -N=C=X material to a latex, dispersion, or emulsion containing a solid polymer:

This subclass is indented under subclass 65. Subject matter wherein an -N=C=X material (X is a chalcogen) is added to an aqueous latex, aqueous dispersion, or aqueous emulsion containing a solid polymeric material.

- (1) Note. The -N=C=X material may be added at any stage of cure with the proviso that it must be added to an aqueous latex, emulsion, or dispersion which is capable of expansion or of further expansion as a latex, emulsion, or dispersion.

68 Adding fibrous material to a latex dispersion, or emulsion containing a solid polymer:

This subclass is indented under subclass 65. Subject matter wherein a fibrous material is added to an aqueous latex, aqueous dispersion, or aqueous emulsion containing a solid polymeric material, or wherein a fibrous material is part of an aqueous latex, aqueous emulsion, or aqueous dispersion containing a previously formed solid polymeric material.

69 Latex, dispersion, or emulsion contains an additional solid polymer-forming system:

This subclass is indented under subclass 65. Subject matter wherein, in addition to at least one solid polymer initially present in the aqueous latex, emulsion, or dispersion, there is also present a reactant or reactants which under the condition of the reaction and in the absence of the initial polymer would form an additional solid polymer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

50, the (9) Note therein, for a discussion of the terms "two solid polymers or polymer forming system". Reactants which form or are known to form initial solid polymers are included herein as being an additional solid polymer forming system. (See Class 521, subclass 50 (11) Note therein).

70, for processes of preparing a cellular product from a composition contain-

ing two or more previously formed solid polymers.

70 Latex, dispersion, or emulsion contains two or more solid polymers:

This subclass is indented under subclass 65. Subject matter wherein two or more solid polymers are present in an aqueous latex, aqueous dispersion, or aqueous emulsion.

- (1) Note. The solid polymers may be in the same or different phase.

71 Solid polymer is derived from a conjugated diene monomer:

This subclass is indented under subclass 65. Subject matter wherein the solid polymer which is part of the aqueous latex, aqueous emulsion, or aqueous dispersion is derived from at least a reactant having two or more conjugated ethylenic groups.

72 Utilizing cell forming agent other than air:

This subclass is indented under subclass 65. Subject matter wherein an agent other than air, per se, is utilized as a means to generate a cellular product.

- (1) Note. The agent may be directly introduced into the aqueous latex, aqueous emulsion, or aqueous dispersion or may be formed in situ.

73 Process of preparing a cellular product of a plastisol of a solid polymer derived solely from ethylenically unsaturated monomers; forming a plastisol of a solid polymer derived solely from an ethylenically unsaturated monomer which is designed to be formed into a cellular product, or composition thereof:

This subclass is indented under subclass 50. Subject matter wherein a cellular product is produced from a nongelled plastisol containing a solid polymer derived solely from ethylenically unsaturated monomers.

- (1) Note. This subclass provides (1) for processes of forming a cellular product from a plastisol composition; (2) for plastisol compositions which will form a cellular product; or (3) for processes of preparing a cellular forming plastisol composition.

- (2) Note. A plastisol is a dispersion of solid polymeric particles in a plasticizer at ambient temperature and which dispersion gels upon heating.

- (3) Note. Patent claims are placed herein when the term "plastisol" is employed in the claim or when the term "plasticize" is employed and there is evidence in the disclosure that a plastisol is intended.

SEE OR SEARCH THIS CLASS, SUBCLASS:

82+, for processes involving a stated ingredient wherein a gelled material is ground to a powder and processed.

74 By incorporation of material in gaseous state:

This subclass is indented under subclass 73. Subject matter wherein a material in a gaseous state is introduced into the plastisol composition.

- (1) Note. Included herein is the introduction of air as by beating or whipping.

SEE OR SEARCH THIS CLASS, SUBCLASS:

73+, for processes wherein a gas is formed in situ in a plastisol composition.

75 System contains two or more solid polymers or contains at least one solid polymer and at least one polymer-forming system:

This subclass is indented under subclass 73. Subject matter wherein the plastisol composition contains at least two solid polymers, or at least one solid polymer and at least one additional solid polymer-forming system.

76 Preparing a cellular product utilizing a stated ingredient which is surface coated or is a discrete solid particle containing a fluid encapsulated therein, processes of forming an expandable composition, containing said stated ingredient or composition therefrom:

This subclass is indented under subclass 50. Subject matter wherein cell formation is achieved or initiated in the presence of (1) a material which is surface coated; or (2) a material which consists of a particle comprising a fluent material encapsulated in a shell.

- (1) Note. The material can be present for any purpose, e.g., reactant, solid polymer, stated ingredient, etc.
- (2) Note. This subclass provides (1) for processes of forming cellular products in the presence of a material which is surface coated or in the presence of an encapsulated fluid; or (2) compositions which are capable of forming a cellular product and which compositions contain an encapsulated fluid or surface coated material; or (3) processes of preparing a cellular forming composition containing a surface coated material or encapsulated fluent material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 77, for a process of preparing a cellular material involving the decomposition of a solid polymer.
- 82+, or 99+, for the preparation of a cellular material involving the use of an impregnated molecular sieve.

77 Preparing a cellular product by decomposition of a solid polymer; or process of forming a composition containing a solid polymer which decomposes so as to subsequently form a cellular polymer, or composition therefrom:

This subclass is indented under subclass 50. Subject matter wherein cell formation is achieved or initiated by decomposing in whole or part a solid synthetic polymer so as to form cells in an additional polymer or to form cells in the polymer undergoing decomposition.

- (1) Note. This subclass provides (1) for processes of forming cellular products in the presence of a decomposing solid polymer; (2) for compositions which are capable of forming a cellular product which composition contains a solid polymer capable of decomposition; or (3) for processes of preparing a cellular forming composition containing a decomposable solid polymer.
- (2) Note. This subclass includes a single solid polymer which decomposes so to form materials which will form cells in

the decomposition product and is still a solid polymer.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 134, for a cellular product which is the result of decomposing a solid polymer in the presence of a different solid polymer and wherein the decomposed polymer is still a solid polymer.

78 Preparing a cellular product by spraying a solid polymer containing material:

This subclass is indented under subclass 50. Subject matter drawn to processes of cell formation wherein cell formation is achieved or initiated by a step of projecting into a gaseous atmosphere in a manner whereby temporary or permanent solid or liquid particles are formed (1) a solid polymer in liquid state (e.g., molten, dissolved, etc.), or (2) solid polymer-forming materials.

- (1) Note. Included in this subclass but not limited thereto are processes of taking solid particles and dissolving same and spraying, as well as melting of solid particles and spraying.
- (2) Note. Processes involving a projecting step wherein cell formation and projecting are incidental to each other, e.g., no cell formation initiated or achieved during the projecting step, etc. are not proper for this subclass.
- (3) Note. This subclass does not provide for compositions which are to be used in preparing cellular product even if claimed as being capable of preparing a cellular product by spraying or for cellular products which are the result of a spraying procedure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 56+, for processes of preparing a cellular product wherein a solid particle is expanded and retains its individual particle identity or wherein individual particles are expanded and coalesce to form an expanded product.

65+, for processes of spraying or projecting an aqueous emulsion, dispersion, or latex.

79 Extruding a solid polymer containing material to form a cellular product:

This subclass is indented under subclass 50. Subject matter drawn to processes of cell formation wherein said cell formation is achieved or initiated by a step of extrusion of a molten or liquid material from a region of high pressure through an orifice into a region of lower pressure.

- (1) Note. Spinning, per se, is proper for this subclass as a specialized form of extrusion wherein a fiber or filament is produced.
- (2) Note. Processes involving an extrusion step wherein cell formation and extrusion are incidental to one another, e.g., no cell formation initiated or achieved during the extruding step, etc., are not proper for this subclass.
- (3) Note. For purposes of this subclass mere removal of material from a chamber by a step recited as "extrusion" is not proper herein unless there is an intent to shape the removed material by the "extrusion step."
- (4) Note. This subclass does not provide for compositions which are to be used in preparing a cellular product even if claimed as being extrudable, or for cellular products which are the result of an extruding procedure.

SEE OR SEARCH CLASS:

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 41+ for processes of preparing a composite article wherein at least one member of the composite is of a porous nature; and subclasses 109+ for processes of bonding either cellular or noncellular particles of solid particles together so as to form a layer and wherein the solid particles may have voids between the bonded particles.

80 Including solid polymer formation in or during extruding step:

This subclass is indented under subclass 79. Subject matter wherein a solid polymer is formed during the extruding step.

- (1) Note. Solid polymer formation does not include cross-linking or vulcanizing of a previously formed solid polymer.

81 System contains a mixture of solid polymers or at least one solid polymer and at least one solid polymer-forming system:

This subclass is indented under subclass 79. Subject matter wherein a mixture of polymers or polymer-forming ingredients is employed during the extrusion step.

- (1) Note. This subclass includes mixed resins, graft copolymer, or block copolymers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

50, (9) Note therein, for a definition of the terms "mixture of polymers or polymer-forming ingredients".

82 Process of forming a cellular product subsequent to solid polymer formation in the presence of a stated ingredient, noncellular composition capable of forming a cellular product and containing a stated ingredient, or process of preparing same:

This subclass is indented under subclass 50. Subject matter wherein cells are formed subsequent to the formation of a solid polymer and wherein the cell formation is performed in the presence of a stated ingredient.

- (1) Note. This subclass provides (1) for processes of forming cellular products in the presence of a stated ingredient; or (2) for solid polymer containing compositions which will form cells and which contain a stated ingredient; or (3) for processes of preparing a polymer containing composition which contains a stated ingredient and wherein said composition can be made into a cell containing product.
- (2) Note. The term "stated ingredient" denotes the intentional and deliberate

presence of an ingredient (other than a monomer or reactant which forms the polymer backbone) during a cell forming process.

I. The term "stated ingredient" is limited to: A. an amount of a material (e.g., 2 percent of a material, etc.); B. (1) a recitation of at least one specified element in compound or in elemental form (e.g., oxygen-liberating compound, peroxy compound, chloride-containing, etc.), (2) groups of elements which can be identified from the periodic table, other than metal or nonmetal (e.g., Group IA, transition metal, halogen-containing, etc.), (3) Compounds which have identified art meaning (e.g., alcohol, ethers, ester, etc.).

II. Examples of materials which are described in mere functional terms and are thereby excluded as being "stated ingredient" since they do not meet the parameters set out in I, A and B above are terms such as free radical catalyst, redox catalyst, emulsifier, dispersant, base, acid, organic medium, blowing agent, etc.

- (3) Note. This subclass relates to both non-reactive and reactive materials. In this regard it is to be noted that the use of the term "stated ingredient" is in the context of materials present during the cell-forming operation and which operation is subsequent to solid polymer formation; hence it is proper to regard a cross-linking agent or a system of additional polymer forming ingredient as being "stated ingredients" when such materials are present and are in admixture with a solid polymer and cell formation is occurring.
- (4) Note. When a material is consumed prior to the cell-forming operation, such material is not to be regarded as a stated ingredient. However, when a material is added to a solid polymer with the intent that such material be present in some degree during the cell-forming operation then such a material is to be regarded as a stated ingredient.

- (5) Note. An exception to the stated ingredient rule is that a solid polymer proper for this Class 520 Series is not to be regarded as a "stated ingredient" for another solid polymer.
- (6) Note. For purposes of this subclass a polymer derived from only ethylenically unsaturated monomers is presumed to be a solid polymer unless contradicted by the patent specification.
- (7) Note. Materials which are present during the cell-forming operation but which are known to form solid polymers apart from the solid polymer originally present are regarded as being "stated ingredients" for purposes of this subclass.
- (8) Note. Carbohydrates, proteins, fats, natural resins, asphaltic, bituminous materials are always regarded as being "stated ingredients" for purposes of this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 76, for processes of preparing cellular materials which may involve the use of a stated ingredient containing a coating of a solid synthetic polymer.
- 77, for cell forming processes utilizing a solid polymer decomposable so as to either form a cellular product of itself or to assist in the preparation of cells of an additional solid polymer.
- 99+, for any other "stated ingredient" present; it is highly desirable that cross-references be placed herein on the basis of such other "stated ingredients".
- 134+, for a process of preparing a cellular product involving two or more solid polymers and in the absence of a "stated ingredient".
- 143, through 189, for processes of preparing a cellular product in the absence of a "stated ingredient".

- 83 Ingredient is asphaltic, bituminous, or water settable inorganic material, e.g., cement, plaster of paris, etc.:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains an asphaltic, bituminous, or water settable inorganic material.
- (1) Note. Asphaltic or bituminous refers to solid or semi-solid materials which are often black or dark brown and which occur naturally, or are obtained by refining petroleum, or are the components of coal which are soluble in organic solvents.
 - (2) Note. As used herein the terms asphaltic or bituminous include asphaltides, asphalt, asphaltic pyrobitumens, ozokerite, earth pitch, mineral pitch, petroleum asphalt, gilsonite, etc.
 - (3) Note. Water settable inorganic material denotes a material hardenable by hydration so as to produce a solid mass, e.g., cement, concrete, plaster of Paris, etc. It furthermore includes systems in any state of cure and which are present for any purpose. If any doubt exists in a claim as to whether an inorganic ingredient is water settable, such doubt should be resolved by classifying the claim into the appropriate subclass below.
- 84.1 Ingredient is protein, carbohydrate, or natural resin:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient is a protein, carbohydrate, natural resin, or derivatives thereof.
- (1) Note. See the Glossary in the class definition of Class 520 for the definition of protein, carbohydrate, natural resin, or derivatives of these materials.
- 85 Ingredient contains a boron or phosphorus atom:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains at least one atom of boron or phosphorus.
- 86 Ingredient is organic silicon compound:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient is an organic compound containing at least one silicon atom.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
91, for the use of elemental silicon or an inorganic silicon compound as stated ingredients.
- 87 Ingredient is aldehyde or ketone:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient is a ketone or aldehyde.
- (1) Note. See the Glossary for a definition of the terms "aldehyde" and "ketone".
- SEE OR SEARCH THIS CLASS, SUBCLASS:
88, for the use of trioxane or paraformaldehyde as stated ingredients.
97, for the use of ketene as a stated ingredient.
- 88 Ingredient is ether, alcohol, or inorganic alcoholate, e.g., phenol, etc.:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains a -C-O-C- group, a C-OH group (X is an inorganic radical), and wherein none of the carbon atoms which are single bonded to the oxygen atom as enumerated above are double bonded to a chalcogen atom (O, S, Se, or Te) or triple bonded to a nitrogen atom, e.g., epoxy compounds, morpholines, cyclic anhydrides, etc.
- 89 Ingredient contains a sulfur atom:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains a sulfur atom.
- 90 Ingredient is a heterocyclic compound:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains a heterocyclic ring.
- (1) Note. See the Glossary in this class (521) for a definition of the term "heterocyclic".

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
88, for an epoxy compound, morpholine, or cyclic anhydride, utilized as a stated ingredient.
89, for a heterocyclic compound having a sulfur atom as a ring atom utilized as a stated ingredient.
- 91 Ingredient contains a silicon atom:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains a silicon atom.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
86, for a stated ingredient which is an organic compound containing a silicon atom.
- 92 Ingredient contains a metal atom:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains a metal atom.
- 93** This subclass is indented under subclass 92. Metal atom is part of an organic compound: Subject matter wherein the metal atom is part of an organic compound.
- 94 Ingredient is a nitrogen containing compound:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient is a nitrogen containing compound.
- (1) Note. This subclass includes ammonium salts.
- 95 Nitrogen compound contains a nitrogen atom bonded to a nitrogen or oxygen atom:**
This subclass is indented under subclass 94. Subject matter wherein the nitrogen compound contains (1) at least one nitrogen atom bonded directly to another nitrogen atom, or (2) at least one nitrogen atom bonded directly to an oxygen atom (e.g., azo, azide, nitrate, etc.).
- 96 Ingredient contains an -O-O- group:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient is a compound which contains an -O-O- structure, e.g., peroxide, etc.
- 97 Ingredient contains a carbon atom double bonded to oxygen, e.g., carbon dioxide, carboxylic acid, etc.:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains a group, etc., carbonates, carbon dioxide, carboxylic acids, etc.
- 98 Ingredient contains only C and H atoms, only C and halogen atoms, or only C, H, and halogen atoms:**
This subclass is indented under subclass 82. Subject matter wherein the stated ingredient contains (1) only carbon and hydrogen atoms, or (2) only carbon, hydrogen, and halogen atoms, or (3) only carbon and halogen atoms.
- (1) Note. This subclass includes the stated ingredient proper for this subclass in any physical state.
- 99 Cellular product formation prior to or during solid polymer formation in the presence of a stated ingredient other than water:**
This subclass is indented under subclass 50. Subject matter wherein cells are formed prior to, or during the solid polymer formation and wherein the cell formation is performed in the presence of a stated ingredient.
- (1) Note. This subclass provides (1) for processes of forming cellular products in the presence of a stated ingredient; or (2) for polymer-forming compositions which will form cells and which contain a stated ingredient; or (3) for processes of preparing a polymer-forming composition which contains a stated ingredient and wherein said composition can be made into a cellular product.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
50, the (7) Note for the definition of "stated ingredient". Certain exceptions do exist and are noted:
(a) Water in any of its physical forms is excluded herefrom as being a stated ingredient.
(b) (B) Materials which are categorized as curing, cross-linking, or chain-extenders are excluded herefrom and are to be consid-

ered as polymer-forming additives.

(c) (C) (1) In processes wherein an isocyanate is a reactant a further exception to the stated ingredient definition is that a compound containing only a single C-XH, C-NH₂, -C=NH, or CXH group (wherein X is a chalcogen) is always considered as being a reactant rather than as a stated ingredient.

(1) (2) In those processes wherein an isocyanate is a reactant a compound containing two or more C-XH, C-NH₂, -C=NH, or CXH groups or combination of such groups (wherein X is a chalcogen) is always considered as being a reactant rather than as a stated ingredient.

134, through 189, for a cellular product which has been prepared in the presence of a stated ingredient.

100 Ingredient is water settable inorganic composition:

This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains an inorganic material hardenable by hydration so to produce a solid mass, e.g., cement, concrete, plaster of Paris, etc.

- (1) Note. This subclass includes systems having cement, concrete, plaster of Paris in any stage of cure.
- (2) Note. The water settable ingredient can be present for any purpose.
- (3) Note. If any doubt exists in a claim as to whether an inorganic ingredient is water settable, such doubt should be resolved by classifying the claim into the appropriate subclass below.

101 Ingredient is bituminous or asphaltic material:

This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains an asphaltic or bituminous material.

(1) Note. Asphaltic or bituminous refers to solid or semi-solid materials which are often black or dark brown and which occur naturally, or are obtained by refining petroleum, or are the components of coal which are soluble in organic solvents.

(2) Note. As used herein the terms asphaltic or bituminous include asphalt, asphaltides, asphaltic pyrobitumens, ozokerite, earth pitch, mineral pitch, petroleum asphalt, gilsonite, etc.

102 Ingredient is a protein containing material:

This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a protein or a protein reaction product, e.g., gelatin, silk, etc.

(1) Note. A protein reaction product requires at the minimum the presence of a peptide group, i.e., an amide linkage between the amino radical of one amino acid and the carboxyl radical of another amino acid.

103 Ingredient contains a boron atom:

This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a boron atom.

104 Boron trihalide or complex thereof:

This subclass is indented under subclass 103. Subject matter wherein the stated ingredient is boron trihalide or is an organic or inorganic complex thereof.

(1) Note. The halogen atoms may be the same as in boron trichloride, or they may be different.

105 Boron atom is part of an organic compound:

This subclass is indented under subclass 103. Boron atom is part of an organic compound: Subject matter wherein the boron atom is part of an organic compound.

106 Ingredient Contains a Phosphorus Atom:

This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a phosphorus atom.

- 107 Phosphorous atom is part of an organic compound:**
This subclass is indented under subclass 106. Subject matter wherein the phosphorus atom is part of an organic compound.
- 108 Organic phosphorus compound contains a phosphorus atom bonded to an atom other than oxygen:**
This subclass is indented under subclass 107. Subject matter wherein the organic phosphorus compound contains at least one phosphorus atom bonded to an element which is other than oxygen.
- 109.1 Ingredient is carbohydrate, or natural resin:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient is a carbohydrate, or natural resin, or derivatives thereof.
- (1) Note. Note See the Glossary in the class definition of Class 520 for the definition of carbohydrate, natural resin, or derivatives of these materials.
- 110 Ingredient contains a silicon atom as part of an organic compound:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient is an organic compound containing at least one silicon atom.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
122, for an inorganic compound containing silicon which is a stated ingredient.
- 111 Organic silicon atom compound contains an atom other than oxygen, hydrogen, silicon or carbon:**
This subclass is indented under subclass 110. Subject matter wherein the organic silicon compound contains an atom other than carbon, hydrogen, oxygen, or silicon.
- 112 Organic silicon compound contains an ether group:**
This subclass is indented under subclass 110. Subject matter wherein the organic silicon compound contains a -C-O-C- group and wherein neither of the carbon atoms single bonded to the oxygen atom is double bonded to a chalcogen atom.
- 113 Ingredient is aldehyde or ketone:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient is a ketone or aldehyde.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
114, for the use of trioxane or paraformaldehyde as stated ingredients.
130, for the use of ketone as a stated ingredient.
- SEE OR SEARCH CLASS:
520, Synthetic Resins or Natural Rubbers, the Glossary, for a definition of the term "aldehyde" or "ketone".
- 114 Ingredient contains a -C-X-C- group wherein X is a chalcogen atom and none of the C atoms bonded to the chalcogen are double bonded to an additional chalcogen atom:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a -C-X-C- group wherein X is a chalcogen atom, and wherein one of the carbon atoms bonded to the chalcogen atom are double bonded to an additional chalcogen atom.
- 115 -C-X-C- compound contains a nitrogen atom:**
This subclass is indented under subclass 114. Subject matter wherein the -C-X-C ingredient contains a nitrogen atom.
- 116 -C-X-C- compound contains a -C-XH group wherein X is a chalcogen atom:**
This subclass is indented under subclass 114. Subject matter wherein the C-X-C ingredient contains a C-XH group.
- 117 Ingredient contains a -C-XH group wherein X is a chalcogen atom and the carbon atom is not double bonded to a chalcogen atom, phenol, etc.:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a C-XH group, wherein X is a chalcogen atom, and wherein the carbon atom bonded to the chalcogen atom of the XH group is not

- double bonded to an additional chalcogen atom.
- Group IB is limited to Cu, Ag, Au.
Group IIB is limited to Zn, Cd, Hg.
- 118 -C-XH ingredient contains a nitrogen atom:**
This subclass is indented under subclass 117. Subject matter wherein the C-XH ingredient contains a nitrogen atom.
- 119 Ingredient is inorganic halogen containing material:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a halogen atom either as elemental halogen or as part of an inorganic halogen compound.
- 120 Ingredient contains a sulfur atom:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a sulfur atom.
- 121 Sulfur atom is part of an organic compound:**
This subclass is indented under subclass 120. Subject matter wherein the sulfur atom is part of an organic compound.
- 122 Ingredient contains a silicon atom:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a silicon atom.
- 123 Ingredient contains a metal atom:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a metal atom.
- 124 Metal atom is part of an organic compound:**
This subclass is indented under subclass 123. Subject matter wherein the metal atom is part of an organic compound.
- 125 Organic metal compound contains a group I or Group II metal atom:**
This subclass is indented under subclass 124. Subject matter wherein the metal atom which is part of the organic compound is a Group I or Group II metal.
- (1) Note. Group I and Group II metal atoms are:
Group IA is limited to L, Na, K, Ru, Cs, Fr.
Group IIA is limited to Be, Mg, Ca, Sr, Ba, Ra.
- 126 Organic metal compound contains tin:**
This subclass is indented under subclass 124. Subject matter wherein a tin atom is part of the organic compound.
- 127 Tin compound is dibutyl tin dilaurate or stannous octoate:**
This subclass is indented under subclass 126. Subject matter wherein the organic tin compound is dibutyl tin dilaurate or stannous octoate.
- 128 Ingredient is a nitrogen containing compound:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient is a nitrogen containing compound.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
133, for the use of nitrogen gas as a stated ingredient.
- 129 Nitrogen compound contains a nitrogen atom bonded to three carbon atoms and wherein none of the carbon atoms are double bonded to oxygen:**
This subclass is indented under subclass 128. Subject matter wherein the nitrogen compound contains at least one nitrogen atom which is bonded to three carbon atoms and wherein none of the carbon atoms bonded to the nitrogen atom are double bonded to oxygen.
- 130 Ingredient contains a carbon atom double bonded to oxygen, e.g., carboxylic acid, etc.:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains a group, e.g., carbonates, CO₂, carboxylic acids, etc.
- 131 Ingredient contains only carbon and hydrogen atoms, only C and halogen atoms, or only C, H, and halogen atoms:**
This subclass is indented under subclass 99. Subject matter wherein the stated ingredient contains (1) only carbon and hydrogen atoms, or (2) only carbon, hydrogen, and halogen atoms, or (3) only carbon and halogen atoms.

132 Said ingredient is substantially nonvolatile material, e.g., hydrocarbon waxes, greases, etc.:

This subclass is indented under subclass 131. Subject matter wherein the stated ingredient which contains (1) only carbon and halogen atoms, or (2) only carbon, hydrogen, and halogen atoms, or (3) only carbon and halogen atoms, is a solid or liquid and has slight or no tendency to pass into a gaseous state under the contemplated conditions of the process.

- (1) Note. Materials proper for this subclass are often described as plasticizers, flame retardants, lubricants, waxes, greases, oils, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 131, for a material chemically proper for this subclass, but which is described as a blowing agent. Where any doubt occurs as to whether appreciable volatilization occurs under the contemplated process conditions, such doubt should be resolved by placing the document into subclass 131.

133 Ingredient is gaseous at ambient conditions, e.g., air, oxygen, etc.:

This subclass is indented under subclass 99. Subject matter wherein the stated ingredient is a gas at normal room temperature and pressure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 130, for carbon dioxide as a stated ingredient.

134 Cellular product derived from two or more solid polymers or from at least one solid polymer-forming system:

This subclass is indented under subclass 50. Subject matter involving a cellular product derived from mixed solid polymers or from a solid polymer and at least one polymer-forming system or process of preparing such a cellular product; compositions containing mixed solid polymers or a solid polymer and a polymer-forming system or processes of preparing and which are capable of forming a cellular product; processes of treating a cellular product derived from mixed solid polymers or from a

solid polymer and a polymer-forming system with a material which neither reacts with the cellular product to change or modify chemical bonds therein or neither forms a desired composition with the cellular product or products of such a treatment; processes of treating a cellular product derived from mixed solid polymers or from a solid polymer and a polymer-forming system without the addition of a material thereto whereby a physical or chemical change in the cellular product may be effected or products which are the result of such a treatment.

- (1) Note. Patents are placed away in this and the indented subclasses on the basis of the first appearing polymer or polymer-forming system provided in the schedule array. Each polymer-forming system is to be equated to the solid polymer that would be prepared if the polymer-forming system were polymerized. This and the indented subclasses includes mixtures of polymers wherein one of said polymers may act as a filler, preservative, etc., for the other polymer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 50, for a definition of the term mixed solid polymer or for system of a polymer and a polymer-forming system.
- 91, for a process of treating a cellular mixed polymer with a material so as to modify or change chemical bonds in the cellular polymer, or wherein a polymer-forming system is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating process.

135 At least one polymer is derived from reactant containing two or more three membered heterocyclic rings having two carbon atoms and one chalcogen atom or polymer-forming system contains the same type of reactant:

This subclass is indented under subclass 134. Subject matter wherein at least one of the polymers in the mixture is derived from a reactant which contains two or more - - groups and wherein X is a chalcogen atom.

136 At least one polymer is derived from an aldehyde or derivative or wherein the polymer-forming system contains the same type of reactant:

This subclass is indented under subclass 134. Subject matter wherein at least one of the polymers is derived from an aldehyde or aldehyde derivative.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, the Glossary, for a definition of the term "aldehyde".

528, Synthetic Resins or Natural Rubbers, subclass 230 for a definition of the term "aldehyde derivative".

137 At least one polymer is derived from a -N=C=X reactant wherein X is a chalcogen atom or wherein the polymer-forming system contains the same type of reactant:

This subclass is indented under subclass 134. Subject matter wherein at least one of the polymers is derived from a -N=C=X reactant and wherein X is a chalcogen atom.

138 At least one polymer is derived from a polycarboxylic acid or derivative and polyol or wherein the polymer-forming system contains the same type of reactants:

This subclass is indented under subclass 134. Subject matter wherein at least one of the polymers is the reaction product of a polycarboxylic acid or derivative and a polyol.

- (1) Note. Polymeric products which are the result of the polymerization of a polycarboxylic acid as a sole reactant are included in this subclass.

SEE OR SEARCH CLASS:

528, Synthetic Resins or Natural Rubbers, the Glossary, for a definition of the term "polycarboxylic acid or derivative".

139 At least one polymer is derived from an ethylenically unsaturated aromatic reactant or

wherein the polymer-forming system contains the same type of reactant:

This subclass is indented under subclass 134. Subject matter wherein at least one of the polymers is derived from an ethylenically unsaturated aromatic reactant.

140 At least one polymer is derived from reactant containing two or more ethylenic groups or wherein the polymer-forming systems contains the same type of reactant:

This subclass is indented under subclass 134. Subject matter wherein at least one of the polymers is derived from a reactant containing two or more ethylenic groups.

141 Cellular vinyl alcohol polymer:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from vinyl alcohol or process of preparing; composition containing a vinyl alcohol polymer and which composition is capable of forming a cellular product or processes of preparing same; processes of treating a cellular polymer derived from a vinyl alcohol polymer with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer; or products of such a treatment; processes of treating a cellular polymer derived from a vinyl alcohol containing polymer without the addition of a material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such treatment.

- (1) Note. A vinyl alcohol containing polymer requires at least 3 () groups in the polymeric molecule.

- (2) Note. Vinyl alcohol polymers for the most part herein are prepared by the partial hydrolysis or saponification of polymers of vinyl esters (particularly homo or interpolymerized vinyl acetate).

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a derived composition therewith, or

for cellular products which are the result of such a treating process.

142 Cellular product derived from ethylenically unsaturated reactants only:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer-derived from only reactants which contain ethylenic unsaturation or process of preparing; composition containing a polymer derived from only reactants containing ethylenic unsaturation or from polymerizable reactants containing only ethylenic unsaturation and which composition is capable of preparing a cellular product or processes of preparing same: processes of treating a cellular polymer derived from only ethylenic reactants with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer derived from only ethylenic reactants without the addition of a material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

(1) Note. Ethylenic unsaturation includes the acetylenic linkage (-C=C-).

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating process.

143 From acyclic mono-unsaturated hydrocarbon as only reactant:

This subclass is indented under subclass 142. Subject matter wherein only mono-ethylenically-unsaturated acyclic hydrocarbons are utilized as reactants.

(1) Note. Included herein are homopolymers of ethylene as well as interpolymers of ethylene with other mono-unsaturated acyclic hydrocarbons.

144 Interpolymer:

This subclass is indented under subclass 143. Subject matter wherein two or more mono-ethylenically-unsaturated acyclic hydrocarbons are utilized as reactants.

145 From acyclic mono-unsaturated halogenated reactant:

This subclass is indented under subclass 142. Subject matter wherein an acyclic mono-ethylenically-unsaturated halogenated hydrocarbon is a reactant.

146 From aromatic reactant:

This subclass is indented under subclass 142. Subject matter wherein an ethylenically unsaturated aromatic material is a reactant.

147 With Oxygen or nitrogen containing reactant:

This subclass is indented under subclass 146. Subject matter wherein the ethylenically unsaturated aromatic reactant is reacted with at least an oxygen or nitrogen containing ethylenically unsaturated reactant.

148 With conjugated diene reactant:

This subclass is indented under subclass 146. Subject matter wherein the ethylenically unsaturated aromatic reactant is reacted with a conjugated diene reactant.

(1) Note. A conjugated diene for purposes of this subclass requires at least two ethylenic bonds separated from each other by a single nonethylenic bond, e.g., -C=C-C=C-

(2) Note. A compound having at least one conjugated unit as in (1) Note above is sufficient for placement into this subclass.

(3) Note. A compound such as a triene is proper herein if it contains at least one conjugated unit.

149 From oxygen containing reactant:

This subclass is indented under subclass 142. Subject matter wherein a solid polymer is derived from at least one reactant containing an oxygen atom.

150 From reactant containing two or more ethylenic unsaturated groups:

This subclass is indented under subclass 142. Subject matter wherein a solid polymer is derived from at least one reactant containing two or more ethylenic groups.

151 Cellular polymer derived from tar, pitch, bitumen, asphalt, or plant material of unknown constitution, e.g., nut shell liquor, etc.:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant which is identified as a tar, pitch, bitumen, asphalt, or as a plant material of substantially undefined chemical identity or process of preparing; compositions containing a polymer derived from a reactant identified as a tar, pitch, bitumen, asphalt, or as a plant material of substantially undefined chemical identity or contain a polymerizable reactant identified as tar, pitch, bitumen, asphalt, or plant material of substantially undefined chemical constitution and which composition is capable of preparing a cellular product or process of preparing same. Processes of treating a cellular polymer derived from at least one reactant which is identified as a tar, bitumen, asphalt, or as a plant material of substantially undefined chemical identity with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer derived from at least one reactant which is identified as a tar, pitch, bitumen, asphalt, or as a plant material of substantially undefined chemical constituent without the addition of a material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

- (1) Note. Tars are the result of thermal decomposition of wood in the substantial absence of oxygen.
- (2) Note. Asphalt or bitumen refers to solid or semi-solid materials which are often black or dark brown and which occur naturally or are obtained by refining petroleum or are the components of coal

which are soluble in organic solvents. The terms also apply to residual materials such as coal, asphaltic, pyrobitumens, ozokerite, tar, pitch (e.g., asphalt, earth pitch, mineral pitch, petroleum asphalt, gilsonite, etc.).

- (3) Note. The types of plant material which are proper for this subclass are those whose composition and constitution are not sufficiently determined to enable their classification in the later subclasses on the basis of a particular reactant.
- (4) Note. Materials which are substantially known as to chemical constitution are excluded from this subclass and are classified below in the schedule on the basis of the first specific reactant which is part of the chemical composition. If any doubt exists as to whether a material is of sufficient chemical identity so as to be classified as a specific reactant then such doubt is to be resolved by classifying the claim as an original in this area and cross referencing to the appropriate reactant area.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a foamed polymer to form a desired composition therewith, or for cellular products which are the result of such a treating process.
- 180, for Cardanol, anacardic acid or derivatives, tannins or tannic acid, or creosylic acid as reactants.

152 Cellular product derived from boron containing reactant:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant which contains a boron atom or process of preparing; composition containing a polymer derived from a reactant containing a boron atom or containing polymerizable reactant containing a boron atom and which composition is capable of preparing a cellular product or processes of preparing same; processes of treating a cellular

polymer derived from a boron containing reactant with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer derived from a boron containing polymer without the addition of a material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating process.

153 Cellular product derived from aluminum or heavy metal containing reactant:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant which contains an aluminum or heavy metal atom or process of preparing; composition containing a polymer derived from a reactant containing an aluminum or heavy metal atom or from a polymerizable reactant containing an aluminum or heavy-metal atom and which composition is capable of preparing a cellular product; processes of treating a cellular polymer derived from an aluminum or heavy metal containing reactant with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer derived from an aluminum or heavy metal containing polymer without the addition of material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

- (1) Note. Heavy metal denotes a metal atom having a specific gravity greater than four.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating process.

154 Cellular product derived from silicon containing reactant:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant which contains a silicon atom or process of preparing; composition containing a polymer derived from a reactant containing a silicon atom or containing a polymerizable reactant containing a silicon atom and which composition is capable of preparing a cellular product or processes of preparing same; processes of treating a cellular polymer derived from a silicon containing reactant with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer derived from a silicon containing polymer without the addition of a material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating process.

155 Cellular product derived from a -N=C=X containing reactant wherein X is a chalcogen atom:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant which con-

tains a $-N=C=X$ group (X is a chalcogen) or process of preparing; composition containing a polymer derived from a reactant containing a $-N=C=X$ group or involving a polymerizable reactant containing a $-N=C=X$ (X is a chalcogen) group and which composition is capable of preparing a cellular product or processes of preparing same; processes of treating a cellular polymer derived from a $-N=C=X$ (X is a chalcogen) containing reactant with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer derived from a $-N=C=X$ reactant without the addition of a material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

- (1) Note. This subclass also provides for those functional derivatives of isocyanates which are generally known as blocked, masked, or hidden isocyanates. These materials are those which revert on heating to the $-N=C=X$ group, (e.g., urethanes or ureides of phenols, alkanols, lactams, oximes, etc.).
- (2) Note. Where a $-N=C=X$ group is produced by an in situ reaction or a decomposition reaction (other than blocked, masked, or hidden isocyanates), those patents have been placed as originals in the subclass which provides for the compound prior to its decomposition or on the basis of the reactants undergoing the in situ reaction, e.g., carbonates or oxalates, etc.
- (3) Note. This subclass includes those compounds wherein the nitrogen ($-N=C=X$) may or may not be bonded to a carbon atom.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith, or

for cellular products which are the result of such a treating operation.

SEE OR SEARCH CLASS:

528, Synthetic Resins or Natural Rubbers, subclasses 44+ for a noncellular polymer derived from a $-N=C=X$ containing reactant.

156 With three-membered heterocyclic reactant containing two carbon atoms and a hetero atom (i.e., nitrogen or a chalcogen atom):

This subclass is indented under subclass 155. Subject matter wherein a compound containing a $-$ (X is nitrogen or a chalcogen atom) group is reacted with a $-N=C=X$ containing material.

157 With a C-C (=X) -XH or C-C (=X) - X-C (=X) -C- reactant wherein X is a chalcogen atom, e.g., carboxylic acid or anhydride, etc.:

This subclass is indented under subclass 155. Subject matter wherein a compound containing a C XH or C X C, (X is a chalcogen) group is reacted with a $-N=C=X$ containing material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

172+, for a cellular product which is the result of the reaction between $-N=C=X$ containing compound and a carboxylic acid ester reactant.

158 With a ketone, aldehyde, or aldehyde derivative:

This subclass is indented under subclass 155. Subject matter wherein a ketone, aldehyde, or aldehyde derivative is reacted with a $-N=C=X$ containing material.

- (1) Note. See the Glossary of this class (521) for a definition of the term "aldehyde" or "ketone"; and see Class 528, subclass 230 for an explanation of the term aldehyde derivative.

SEE OR SEARCH THIS CLASS, SUBCLASS:

163+, for a polyarylene polyamine as a reactant which polyarylene polyamine has been prepared by the reaction of formaldehyde and an aromatic amine.

159 N=C=X reactant having at least two C-NH-C (=X) - groups, e.g., prepolymers, etc.:

This subclass is indented under subclass 155. Subject matter wherein the -N=C=X (X is chalcogen) reactant contains at least two C-NH groups.

- (1) Note. Patents for the most part herein concern the after treatment of a prepolymer having a terminal -N=C=X group.

SEE OR SEARCH THIS CLASS, SUBCLASS:

155, through 158 and 160 through 177, for products and processes where a prepolymer is inherently prepared in an ongoing polymerization reaction and is subsequently modified, but where no intent has been made to recognize or identify the prepolymer intermediate.

160 Two or more N=C=X reactants:

This subclass is indented under subclass 155. Subject matter wherein two or more -N=C=X (X is a chalcogen) containing materials are employed.

- (1) Note. Excluded from this subclass are those conventional commercial compositions which are mixtures of toluene diisocyanate (e.g., 2, 4 and 2, 6 TDi, 20/80 percent and 35/65 percent, etc.). However, mixtures of stereo and position isomers are included herein if proportions are recited.

161 N=C=X reactant contains a heterocyclic ring:

This subclass is indented under subclass 155. Subject matter wherein the -N=C=X reactant contains a heterocyclic ring.

- (1) Note. See the Glossary in this class (521) for a definition of the term "heterocyclic" ring.

162 N=C=X reactant contains atoms other than carbon and hydrogen and other than nitro-**gen and chalcogen as part of the N=C=X group:**

This subclass is indented under subclass 155. Subject matter wherein the -N=C=X reactant contains atoms other than carbon and hydrogen and atoms other than nitrogen or chalcogen as part of the -N=C=X moiety.

- (1) Note. This subclass provides for -N=C=X reactants containing atoms other than C, H, N, or chalcogen, and for -N=C=X compounds wherein nitrogen or chalcogen are present but are not part of the -N=C=X moiety.

163 With nitrogen containing reactant:

This subclass is indented under subclass 155. Subject matter wherein a nitrogen containing material is reacted with a -N=C=X containing reactant.

164 Nitrogen reactant contains a C-XH group wherein X is a chalcogen atom and wherein the C atom is not double-bonded to a chalcogen atom:

This subclass is indented under subclass 163. Subject matter wherein the nitrogen reactant contains a C-XH (X is a chalcogen) group and wherein at least one carbon atom that may be bound to a -XH group is not double bonded to a chalcogen atom. Included herein are alcohols, etc.

165 Phosphorus containing reactant:

This subclass is indented under subclass 164. Subject matter wherein a phosphorus containing material is employed as a reactant.

- (1) Note. The phosphorus containing material may be in the same compound as the nitrogen atom or may be in a separate reactant.

166 Nitrogen reactant contains a nitrogen containing heterocyclic ring:

This subclass is indented under subclass 164. Subject matter wherein a heterocyclic compound containing a nitrogen atom as a ring atom is employed as a reactant.

SEE OR SEARCH CLASS:

520, Synthetic Resins and Rubbers, Glossary, for a definition of the term "heterocyclic".

- 167 Nitrogen reactant contains a N-(C-C-O)-group:**
This subclass is indented under subclass 164. Subject matter wherein the nitrogen reactant contains a N-(C-C-O)- group.
- (1) Note. A nitrogen compound which has been reacted with a reactant containing a 1, 2 epoxy group is considered the absence of disclosure to the contrary as containing a N-(C-C-O)- group.
- 168 With phosphorus containing reactant:**
This subclass is indented under subclass 155. Subject matter wherein a phosphorus containing material is reacted with a -N=C=X reactant.
- 169 Phosphorus reactant contains a -O-(C-C-O)-group:**
This subclass is indented under subclass 168. Subject matter wherein the phosphorus reactant contains a -O-(C-C-O)- group.
- (1) Note. A phosphorus compound which has been reacted with a reactant containing a 1, 2 epoxy group is considered in the absence of disclosure to the contrary as containing a -O-(C-C-O)- group.
- 170 With -XH reactant wherein X is a chalcogen atom:**
This subclass is indented under subclass 155. Subject matter wherein a -XH (X is a chalcogen containing material) is reacted with a -N=C=X containing material.
- (1) Note. For purposes of this subclass the -XH material need not be bonded to a carbon atom.
- (2) Note. This subclass includes but is not limited to mercaptans, glycols, and carbonic acid as reactants.
- 171 -XH reactant contains a halogen atom:**
This subclass is indented under subclass 170. Subject matter wherein the -XH (X is a chalcogen) reactant contains a halogen atom.
- 172 -XH reactant contains a C=X group, e.g., carboxylic acid ester, etc.:**
This subclass is indented under subclass 170. Subject matter wherein XH reactant contains a (X is a chalcogen atom) group.
- 173 With non -C=X containing reactant:**
This subclass is indented under subclass 172. Subject matter wherein in addition to the -N=C=X and containing reactant there is present a third reactant which is devoid of any group.
- 174 -XH reactant contains a C-X-C group:**
This subclass is indented under subclass 170. Subject matter wherein the -XH reactant contains a -C-X-C group (X is a chalcogen).
- 175 C-X-C reactant contains a carbohydrate group:**
This subclass is indented under subclass 174. Subject matter wherein the -XH containing -C-X-C- reactant contains a carbohydrate group.
- 176 With non -C-X-C- containing reactant:**
This subclass is indented under subclass 174. Subject matter wherein at least one reactant which is other than a -N=C=X containing reactant and is other than a reactant containing both a -XH and a -C-X-C group is utilized.
- 177 C-X-C reactant contains a carbocyclic ring, e.g., aromatic, etc.:**
This subclass is indented under subclass 174. Subject matter wherein the -XH containing -C-X-C- reactant contains a carbocyclic ring.
- 178 Cellular product derived from a reactant containing two or more three-membered heterocyclic rings wherein two of the ring members are carbon atoms and the remaining ring member is a chalcogen atom:**
This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant containing two or more -- groups (X is a chalcogen) or process of preparing composition containing a polymer derived from a reactant containing two or more -- groups or involving a polymerizable reactant containing two or more -- (X is a chalcogen) groups and which composition is capable of forming a cellular product or processes of preparing same; processes of treating

a cellular polymer derived from a reactant containing two or more -- groups (X is a chalcogen) with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer derived from a reactant containing two or more -- groups without the addition of a material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating operation.

179 With -C (=X) -X containing reactant wherein X is a chalcogen atom:

This subclass is indented under subclass 178. Subject matter wherein the said three-membered heterocyclic material is reacted with a X containing reactant and wherein X is a chalcogen atom.

180 Cellular product derived from a phenol, phenol ether, or inorganic phenolate reactant:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant which is a phenol, phenol ether, or inorganic phenolate or process of preparing; composition containing a polymer derived from a phenol, phenol ether, or inorganic phenolate or involving a polymerizable phenol, phenol ether or inorganic phenolate and which composition is capable of forming a cellular product or processes of preparing same; processes of treating a cellular polymer derived from a phenol, phenol ether, or inorganic phenolate with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer

without the addition of a material thereto whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein material is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating process.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, the Glossary, for a definition of the terms "phenol", "phenol ether", or "inorganic phenolate".

181 With reactant which is an aldehyde or aldehyde derivative:

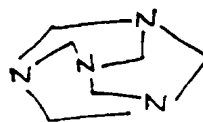
This subclass is indented under subclass 180. Subject matter wherein the phenol, phenol ether, or inorganic phenolate is reacted with a aldehyde or derivative.

(1) Note. See Class 520, Glossary for a definition of the term "aldehyde". An "aldehyde derivative" is as follows:

(1)A compound having a -X-CH₂-OH group wherein X is other than carbon or hydrogen (e.g. para-formaldehyde, methylol derivatives of urea, etc.).

(2)A heterocyclic compound having only carbon and oxygen as ring members in an alternating manner and in equal amount, i.e., e.g., trioxane.

(3)Hexamethylenetetramine (CH₂)₆N₄, known also as methenamine, hexamine, formine,



amino form, hexamethyleneamine and urotropin, and its derivatives.

A derivative for purposes of this subclass requires the basic ring structure of hexamethylenetetramine but wherein the hydrogen atoms may have been replaced by other atoms.

- (2) Note. Compounds having a $-CH_2OH$ group bonded to atoms other than C, H or oxygen are regarded as being two compounds; for instance, a methylol derivative of melamine is regarded as a mixture of melamine and formaldehyde and methylol urea is regarded as being a mixture of urea and formaldehyde.
- (3) Note. A unspecified novolak or resole is proper for this area in that it is a mixture of a phenol and an aldehyde. If a novolak or resole of specified structure is claimed as a reactant, then classification is proper based on the structure of the specific reactant.

182 Cellular product derived from a $-C-C(=X)-X$ containing reactant wherein X is a chalcogen atom, e.g., phthalic acid, etc.:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant containing a $-C-X$ group (X is a chalcogen) or processes of preparing; composition containing a polymer derived from a $-C-X$ (X is a chalcogen) reactant or involving a polymerizable reactant and which composition is capable of forming a cellular product or processes of preparing same; processes of treating a cellular polymer derived from a $-CX$ (X is a chalcogen) reactant with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer, or products of such a treatment; processes of treating a cellular polymer without the addition of a material whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for a process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating operation.

183 Nitrogen containing reactant:

This subclass is indented under subclass 182. Subject matter wherein at least one reactant contains a nitrogen atom.

- (1) Note. The nitrogen atom may be part of the $C-X$ reactant or may be part of an additional co-reactant.

184 Nitrogen reactant contains at least two amino nitrogen atoms:

This subclass is indented under subclass 183. Subject matter wherein at least one reactant contains two or more amine groups.

- (1) Note. An amine proper for this subclass requires (a) at least two distinct nitrogen atoms bonded to at least two distinct carbon atoms, or (b) the presence of at least two nitrogen atoms bonded to the same carbon atom. Each nitrogen atom single or double-bonded in the manner set forth above and consistent with the (1) Note above is an amine.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, the Glossary, for a definition of the term "amine".

185 Carbocyclic reactant containing $-C-C(=X)-X$, e.g., containing carboxyl, etc.:

This subclass is indented under subclass 184. Subject matter wherein the $-C-X$ containing reactant is part of a compound which contains a carbocyclic ring.

186 Cellular product derived from reactant which is an aldehyde or aldehyde derivative:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one aldehyde or deriva-

tive as a reactant or processes of preparing; composition containing a polymer derived from an aldehyde or derivative as a reactant or involving a polymerizable aldehyde or derivative and which composition is capable of forming a cellular product or processes of preparing; processes of treating a cellular polymer derived from an aldehyde or derivative with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein or neither forms a desired composition with the cellular polymer or products of such a treatment; processes of treating a cellular polymer without the addition of a material whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53, for processes of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith, or for cellular products which are the result of such a treating operation.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, the Glossary, for a definition of the term "aldehyde".

528, Synthetic Resins or Natural Rubbers, subclass 230 for a definition of the term "aldehyde derivative".

187 Nitrogen containing reactant:

This subclass is indented under subclass 186. Subject matter wherein at least one reactant contains a nitrogen atom.

- (1) Note. The nitrogen atom may be part of the aldehyde or derivative or may be part of an additional coreactant. Hexamethylenetetramine although an aldehyde derivative is excluded from this subclass as being a nitrogen containing reactant.

188 Nitrogen reactant contains a -N-C (=X) -N group wherein X is a chalcogen atom, e.g., urea, etc.:

This subclass is indented under subclass 187. Subject matter wherein the nitrogen reactant contains a -N N moiety wherein X is a chalcogen atom.

189 Cellular product derived from reactant containing a carbon to chalcogen bond:

This subclass is indented under subclass 50. Subject matter involving a cellular polymer derived from at least one reactant having chalcogen (i.e., oxygen, sulphur, selenium, or tellurium) bonded directly to carbon or processes of preparing a composition containing a polymer derived from such a reactant or involving a polymerizable reactant having chalcogen bonded directly to carbon and which composition is capable of forming a cellular product or process of preparing same; processes of treating a cellular polymer derived from such a reactant with a material which neither reacts with the cellular polymer to change or modify chemical bonds therein nor forms a desired composition with the cellular polymer or products thereof; processes of treating a cellular polymer without the addition of a material whereby a physical or chemical change in the polymer may be effected or products which are the result of such a treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

53+, for process of treating a cellular polymer with a material so as to modify or change chemical bonds in the cellular polymer or wherein a material is added to a cellular polymer to form a desired composition therewith; of for cellular products which are the result of such a treating operation.

CROSS-REFERENCE ART COLLECTIONS

The following subclasses are collections of published disclosures pertaining to various aspects of art relating to cellular polymers which do not form an appropriate base for subclass classification in the classification schedule.

- (1) Note. Disclosures have been placed for value as a search aid and in no instance

- do they represent the entire extent of the prior art.
- 901 CELLULAR POLYMER CONTAINING A CARBODIIMIDE STRUCTURE:**
Subject matter involving cellular products containing the carbodiimide structure, i.e., -N=C=N-.
- 902 CELLULAR POLYMER CONTAINING AN ISOCYANURATE STRUCTURE:**
Subject matter involving cellular products containing the isocyanurate structure, i.e.,
- 903 CELLULAR POLYMER HAVING REDUCED SMOKE OR GAS GENERATION:**
Subject matter involving cellular products which are designed to have reduced smoke or gas generation upon burning.
- 904 POLYURETHANE CELLULAR PRODUCT HAVING HIGH RESILIENCY OR COLD CURE PROPERTY:**
Subject matter involving cellular polyurethane products having high resiliency or cold cure property.
- 905 HYDROPHILIC OR HYDROPHOBIC CELLULAR PRODUCT:**
Subject matter involving a cellular polymer which has a specific affinity for or aversion to water, i.e., possessing hydrophilic or hydrophobic properties.
- 906 POLYURETHANE CELLULAR PRODUCT CONTAINING UNREACTED FLAME-RETARDANT MATERIAL:**
Subject matter involving a cellular polyurethane polymer having incorporated therein a nonreactive material which enhances the ability of the polyurethane to withstand combustion or the effects of fire.
- 907 NONURETHANE FLAMEPROOFED CELLULAR PRODUCT:**
Subject matter involving a nonpolyurethane cellular product having specific flameproof properties.
- 908 NUCLEATING AGENT FOR CELLULAR PRODUCT:**
Subject matter involving specified nucleating agents utilized in preparing cellular products.
- 909 BLOWING-AGENT MODERATOR, E.G., KICKERS, ETC.:**
Subject matter involving an agent which is not generally by itself a blowing agent and which retards, modifies, accelerates, or in other manner affects the blowing characteristics of utilized blowing agent.
- 910 PLURAL BLOWING AGENTS FOR PRODUCING NONPOLYURETHANE CELLULAR PRODUCTS:**
Subject matter involving preparing a nonpolyurethane cellular product by utilizing two or more distinct blowing agents either together or at different times.
- 911 SURFACANT FOR OTHER THAN POLYURETHANE CELLULAR PRODUCT:**
Subject matter involving specified surfactants utilized in preparing nonpolyurethane cellular products.
- 912 SEPARATED REACTIVE MATERIALS UTILIZED IN PREPARING CELLULAR PRODUCT:**
Subject matter involving utilizing two or more reactive materials which are generally separated from each other by some barrier layer.
- 913 CELL FORMING IN ABSENCE OF EXTERNAL HEAT:**
Subject matter involving a cell forming process wherein the cells are generated in the absence of externally applied heat.
- 914 POLYURETHANE CELLULAR PRODUCT FORMED FROM A POLYOL WHICH HAS BEEN DERIVED FROM AT LEAST TWO 1, 2 EPOXIDES AS REACTANTS:**
Subject matter involving polyurethane cellular products derived from at least one polyether polyol which polyether polyol has been prepared from at least two 1, 2 alkylene oxides.
- 915 UTILIZING ELECTRICAL OR WAVE ENERGY DURING CELL FORMING PROCESS:**
Subject matter involving preparing a cellular product under the influence of electrical or wave energy.

- 916 CELLULAR PRODUCT HAVING ENHANCED DEGRADABILITY:**
Subject matter involving a cellular product which has been formulated or prepared with the intent that said cellular product will be easily degraded for ecological or for any other purpose.
- 917 SPECIALIZED MIXING APPARATUS UTILIZED IN FORMING PROCESS:**
Subject matter involving mixing apparatus specialized or uniquely adapted to forming cellular products.
- 918 PHYSICAL AFTER-TREATMENT OF A CELLULAR PRODUCT:**
Subject matter involving physically treating a cellular product.
- 919 SINTERED PRODUCT:**
Subject matter involving a product having voids therebetween and which products are usually formed by agglomerating or uniting particles together.
- 920 CELLULAR PRODUCT CONTAINING A DYE OR PIGMENT:**
Subject matter involving a cellular product having incorporated therein a dye or a pigment.
- 921 PREPARING A NONPOLYURETHANE CELLULAR PARTICLE FROM A NON-PARTICULATE MATERIAL:**
Subject matter involving processes of preparing a particulate nonpolyurethane cellular product from a nonparticulate, noncellular material.

END