H01G

CAPACITORS; CAPACITORS, RECTIFIERS, DETECTORS, SWITCHING DEVICES, LIGHT-SENSITIVE OR TEMPERATURE-SENSITIVE DEVICES OF THE ELECTROLYTIC TYPE (selection of specified materials as dielectric H01B 3/00; capacitors having potential barriers H10D 1/62, H10K 10/10)

Definition statement

This place covers:

Passive two-terminal electrical components used to store energy in an electrical field, typically two electrical conductors, i.e. electrodes, separated by a dielectric or dielectric medium.

Non-electrolytic, fixed capacitors, per se, e.g. thin and thick film capacitors, details thereof, e.g. electrodes, dielectrics, housings and encapsulations, and structural combinations thereof with each other, e.g. stacked, multilayer, feed-through or anti-noise capacitors, or with electrolytic devices covered by this subclass, or with other electric elements not covered by this subclass where the structure consists mainly of a capacitor. Processes of manufacture thereof. H01G 4/00.

Non-electrolytic, variable capacitors per se, in which the capacitance is varied by mechanical means, e.g. using variation of effective area of electrode, using variation of distance between electrodes, e.g. capacitors making use of microelectromechanical systems (MEMS), or using multiple capacitors. Details thereof, and structural combinations thereof with each other, with electrolytic devices covered by this subclass, or with other electric elements not covered by this subclass where the structure consists mainly of a capacitor. Processes of manufacture thereof. H01G 5/00.

Non-electrolytic, variable capacitors per se, in which the capacitance is varied by non-mechanical means, e.g. electrets, ferroelectric capacitors. Details thereof, and structural combinations thereof with each other, with electrolytic devices covered by this subclass, or with other electric elements not covered by this subclass where the structure consists mainly of a capacitor. Processes of manufacture thereof. H01G 7/00.

Electrolytic capacitors per se, e.g. liquid, solid, electric double layer, hybrid or redox capacitors, details thereof, e.g. terminals, electrolytes, electrodes, housings, and processes of manufacture thereof. Electrolytic rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices per se, and details thereof. Structural combinations thereof with each other, with non-electrolytic capacitors or with other electric components not covered by this subclass. Processes of manufacture thereof. H01G 9/00.

Apparatus specially adapted for manufacturing capacitors; Processes specially adapted for manufacturing capacitors not provided for in other main groups of this subclass. H01G 13/00.

Structural combinations of capacitors or other devices covered by at least two different main groups of this subclass with each other. H01G 15/00.

Structural combinations of capacitors or other devices covered by at least two different main groups of this subclass with other electric elements, not covered by this subclass, e.g. RC combinations. H01G 17/00.Details common to two or more main types of devices covered by this subclass, e.g. special adaptation for mounting; cooling, heating and ventilating arrangements; housings, encapsulations and protection or prevention arrangements. H01G 2/00.

References

Limiting references

This place does not cover:

Selection of specified materials as dielectric	H01B 3/00

Capacitors having potential barriers	H10D 1/62 , H10K 10/10

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Capacitive deionisation for electrochemical separation	C02F 1/4691
Indicating or measuring liquid level, or level of fluent solid material by measuring variations of capacity of capacitors	G01F 23/26
Measuring temperature using capacitive elements	G01K 7/34
Impedance networks utilising capacitors, e.g. filters and circuitry thereof	H03H
Electret transducers	H04R 19/00
Printed circuits incorporating printed capacitors	H05K 1/16
Capacitors specially adapted for integration, e.g. stacked capacitors in DRAM	H10B 12/00, H10D 1/68
Thin- or thick-film solid state devices	H10N 97/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Powder metallurgy	B22F
Layered products	B32B
Micromechanical devices, comprising flexible or deformable elements	B81B 3/00
Active carbon	C01B 32/30
Compositions of ceramic materials	C04B 35/00
Polymeric films or sheets	C08J 5/18
Electrolytic coating by surface reaction, i.e. forming conversion layers	C25D 11/00- C25D 11/38
Measuring force or stress by measuring variations in capacitance	G01L 1/14
Measuring steady or quasi-steady pressure of a fluid or a fluent solid material by making use of variations in capacitance	G01L 9/12
Investigating or analysing material by investigating capacitance	G01N 27/22
Measuring capacitance; Measuring dielectric constants	G01R 27/26
Variable capacitance devices operated as switches	H01H 1/00
Batteries and fuel cells	H01M
Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries	H02J 7/00
Casings for electrical apparatus in general	H05K 5/00

Special rules of classification

Processes of manufacture specially adapted for manufacturing capacitors, e.g. parts thereof. e.g. dielectrics, electrodes, etc are covered by the corresponding product subgroups.

The following exceptions apply:

- Solid inorganic dielectrics vapour deposited are covered by H01G 4/08.

- Formation of the dielectric layer is covered by H01G 9/0032.
- Formation of a solid electrolyte layer is covered by H01G 9/0036.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

collector	a conductive component in intimate contact with an electrode material in an electrolytic or electric double layer capacitor
electrolyte	an ionic conducting liquid or solid either comprised in one of the electrodes, typically the cathode, of an electrolytic capacitor or ensuring electric conduction between electrode active parts or electric double layers therein in Electric Double Layer Capacitors

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

MLCC	Multilayer Ceramic Capacitor
EDLC	Electric Double Layer Capacitor

In patent documents, the following words/expressions are often used as synonyms:

- "capacitor" and "condenser"
- "supercapacitor", "ultracapacitor, "electrochemical capacitor" and "electric double layer capacitor"
- "multilayer capacitor" and "stacked capacitor"
- condenser
- capacitor
- electrochemical capacitor
- double-layer capacitor
- ultracapacitor
- supercapacitor

H01G 2/00

Details of capacitors not covered by a single one of groups H01G 4/00-H01G 11/00

Definition statement

This place covers:

Details common to two or more main types of devices covered by this subclass, e.g. special adaptation for mounting; cooling, heating and ventilating arrangements; housings, encapsulations and protection or prevention arrangements.

Relationships with other classification places

This group covers details of capacitors that are not provided for in a single one of groups H01G 4/00 - H01G 11/00.

For example, encapsulations specific to fixed capacitors H01G 4/224, encapsulations specific to hybrid or EDL capacitors H01G 11/78, whereas group H01G 2/10 covers encapsulations where the type of capacitor is unspecified or the encapsulation is generally applicable to several types of capacitors as covered by groups H01G 4/00 - H01G 11/00.

H01G 4/00

Fixed capacitors; Processes of their manufacture (electrolytic capacitors H01G 9/00)

Definition statement

This place covers:

Non-electrolytic, fixed capacitors, per se, e.g. thin or thick film capacitors, details thereof, e.g. electrodes, dielectrics, housings and encapsulations, structural combinations thereof with each other, e.g. stacked, multilayer, feed-through or anti-noise capacitors, or with electrolytic devices covered by this subclass, or with other electric elements not covered by this subclass where the structure consists mainly of a capacitor. Processes of manufacture thereof.

H01G 5/00

Capacitors in which the capacitance is varied by mechanical means, e.g. by turning a shaft; Processes of their manufacture

Definition statement

This place covers:

Non-electrolytic, variable capacitors per se, in which the capacitance is varied by mechanical means, e.g. using variation of effective area of electrode, using variation of distance between electrodes, e.g. capacitors making use of microelectromechanical systems (MEMS), or using multiple capacitors. Details thereof or structural combinations thereof with each other, with electrolytic devices covered by this subclass, or with other electric elements not covered by this subclass where the structure consists mainly of a capacitor. Processes of manufacture thereof.

H01G 7/00

Capacitors in which the capacitance is varied by non-mechanical means; Processes of their manufacture

Definition statement

This place covers:

Non-electrolytic, variable capacitors per se, in which the capacitance is varied by non-mechanical means, e.g. electrets, ferroelectric capacitors. Details thereof or structural combinations thereof with each other, with electrolytic devices covered by this subclass, or with other electric elements not covered by this subclass where the structure consists mainly of a capacitor. Processes of manufacture thereof.

H01G 9/00

Electrolytic capacitors, rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices; Processes of their manufacture

Definition statement

This place covers:

Electrolytic capacitors per se, e.g. liquid or solid capacitors, details thereof, e.g. terminals, electrolytes, electrodes, housings, and processes of manufacture thereof. Electrolytic rectifiers, detectors, switching devices, light-sensitive or temperature-sensitive devices per se and details thereof. Structural combinations thereof with each other, with non-electrolytic capacitors or with other electric components not covered by this subclass. Processes of manufacture thereof.

H01G 9/20

Light-sensitive devices

Definition statement

This place covers:

Photoelectrochemical cells based on junctions between an inorganic semiconductor and an electrolyte

Photoelectrochemical cells based on a dye dissolved in the electrolyte or adsorbed on an electrode

References

Limiting references

This place does not cover:

Photo electrochemical storage cells	H01M 14/005
Inorganic semiconductor devices sensitive to electromagnetic or corpuscular radiation	H10F
Solid state light sensitive devices using an organic semiconductor as the active part	H10K 30/00

Special rules of classification

In this group, documents are classified according to the inventive information e.g. classification symbol H01G 9/2031, while "additional information" is identified with Indexing Code symbols, e.g. H01G 9/2059.

In this subclass, Indexing Codes are mainly attributed with a view to allow retrieval of documents comprising a combination of technical characteristics, some of them being unimportant per se, and, hence, identified with an Indexing Code symbol rather than with the corresponding potential-jump barrier or surface barrier.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

DSSC	dye sensitized solar cell
PEC	photo electrochemical cell

H01G 9/2004

{characterised by the electrolyte, e.g. comprising an organic electrolyte}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Primary cells with non-aqueous electrolyte	H01M 6/14
Accumulators with non-aqueous electrolyte	H01M 10/05

H01G 9/2027

{comprising an oxide semiconductor electrode}

Definition statement

This place covers:

Photo electrochemical cells having an oxide semiconductor as working electrode or having oxide semiconductor particles dispersed in the electrolyte;

examples of oxide semiconductors are: zinc oxide [ZnO], tungsten trioxide [WO_3], copper oxide [CuO], niobium pent oxide [Nb_2O_5]

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Zinc oxides	C01G 9/02
Tungsten oxides	C01G 41/02

H01G 9/2031

{comprising titanium oxide, e.g. TiO_2 (H01G 9/2036 takes precedence)}

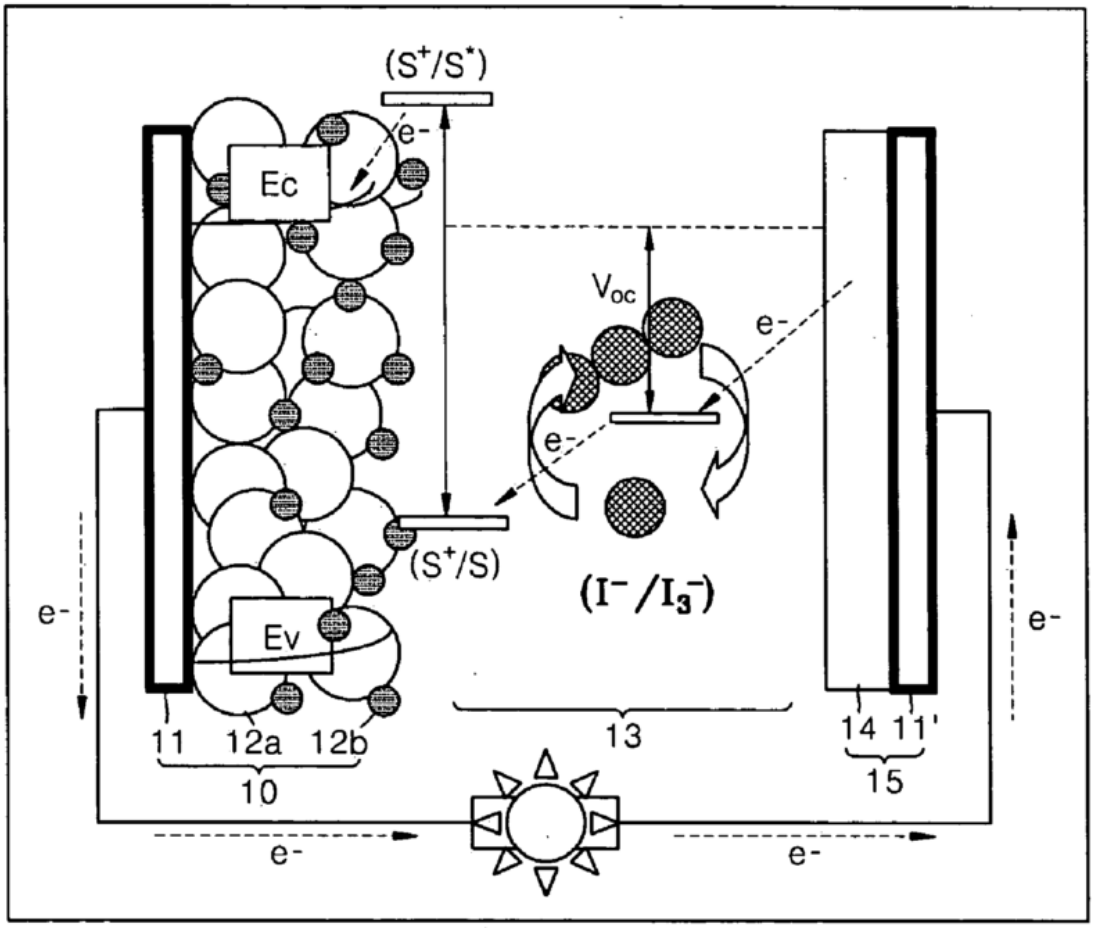
Definition statement

This place covers:

Dye sensitized solar cells; the sensitizer may be a dye (organic) or an inorganic pigment, e.g. PbSe nanoparticles.

Working principle of a dye sensitized solar cell

Illustrative example of subject matter classified in this group.I



US2009173381

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Titanium oxides	C01G 23/04

H01G 9/2054

{comprising a semiconductor electrode comprising AII-BVI compounds, e.g. CdTe, CdSe, ZnTe, ZnSe, with or without impurities, e.g. doping materials (H01G 9/2027 takes precedence)}

References

Limiting references

This place does not cover:

Light sensitive devices comprising an oxide semiconductor electrode	H01G 9/2027

H01G 9/2068

{Panels or arrays of photoelectrochemical cells, e.g. photovoltaic modules based on photoelectrochemical cells}

Definition statement

This place covers:

- Serial interconnection of photoelectrochemical cells;
- sealing of photoelectrochemical cells;
- dye sensitized solar cells in form of a fibre;
- special provisions for filling the photoelectrochemical cell with the electrolyte or dyeing solution.

H01G 11/00

Hybrid capacitors, i.e. capacitors having different positive and negative electrodes; Electric double-layer [EDL] capacitors; Processes for the manufacture thereof or of parts thereof

Definition statement

This place covers:

Hybrid capacitors, i.e. capacitors having different positive and negative electrodes; electric double-layer [EDL] capacitors; processes for the manufacture thereof or of parts thereof.

More specifically the following subjects are covered:

- Capacitors using combined reduction-oxidation reactions at electrode surfaces or at the interface electrode/electrolyte, e.g. redox arrangement or solion.
- Structural combinations, e.g. assembly or connection, of hybrid or EDL capacitors with other electric components, at least one hybrid or EDL capacitor being the main component, or multiple hybrid or EDL capacitors, e.g. arrays or modules, including stacked hybrid or EDL capacitors.
- Arrangements or processes for adjusting or protecting hybrid or EDL capacitors e.g. against electric or thermal overloads as well as reformation or processes for removal of impurities.
- Electrodes thereof, e.g. characterised by structural features of the materials making up or comprised therein or characterised by their material, e.g. based on carbon, metal oxides, conductive polymers or specially adapted for lithium-ion capacitors.
- Other components of hybrid or EDL capacitors covered include separators, electrolytes e.g., solid, liquid, current collectors and terminals.
- Cases; housings; encapsulations; mountings including gaskets or sealing and fixing or assembling a hybrid or EDL capacitive element in a housing, e.g. mounting electrodes, current collectors or terminals in containers or encapsulations.
- Processes for the manufacture of hybrid or EDL capacitors, or components thereof, including processes specially adapted for the manufacture of the electrodes.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Carbon or inorganic carbon compounds thereof	C01B 32/00
Active carbon compounds	C01B 32/30
Compositions of ceramic materials	C04B 35/00
Polymeric films or sheets	C08J 5/18

Batteries or fuel cells in general	H01M
Carbonaceous material for inserting or intercalating light metals	H01M 4/587
Carriers or collectors of a battery	H01M 4/64
Li-accumulators	H01M 10/052
Accumulators characterised by the material used as electrolytes	H01M 10/056
Hybrid cells, i.e. electrochemical generators having two different types of half-cells, the half-cell being an electrode-electrolyte combination of either a primary, a secondary, or a fuel cell	H01M 12/00
Cases, mountings of batteries	H01M 50/10, H01M 50/20
Separators for batteries	H01M 50/40
Terminals of a battery	H01M 50/543
Electric power networks; Circuit arrangements or systems for supplying or distributing electric power; Systems for storing electric energy	H02J
Circuit arrangements for charging or depolarising batteries or for supplying loads from batteries; with parallel operation in networks using both storage and other DC sources, e.g. providing buffering	H02J 7/00, H02J 7/34
Capacitors embedded in printed circuits	H05K 1/162
Casings for electrical apparatus in general	H05K 5/00
Thin film capacitors for integrated circuits	H10D 1/62

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

electrochemical storage device	means a battery, accumulator or capacitor
collector	means a conductive component in intimate contact with an electrode material in an hybrid or EDL capacitor
electrolyte	refers to an ionic-conducting liquid or solid ensuring electric conduction between electrode active parts or electric double layers, inside hybrid or EDL capacitors

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "electrochemical capacitor", "EDL capacitor", "ultracapacitor", "supercapacitor" and "hybrid capacitor"