

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H01 ELECTRIC ELEMENTS

(NOTES omitted)

H01M PROCESSES OR MEANS, e.g. BATTERIES, FOR THE DIRECT CONVERSION OF CHEMICAL ENERGY INTO ELECTRICAL ENERGY

NOTE

This subclass covers galvanic primary or secondary cells or batteries, fuel cells or stacks.

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

4/00	Electrodes	4/0438	. . . {by electrochemical processing (electroless electrochemical plating C23C 18/54)}
	NOTE	4/044	. . . . {Activating, forming or electrochemical attack of the supporting material}
	In classifying electrodes of hybrid cells, the individual half-cells of the hybrid cell are considered separately, e.g. an electrode in the primary half of a primary/fuel type hybrid cell is considered to be a primary-cell electrode covered by H01M 4/06 .	4/0442	. . . . . {Anodisation, Oxidation (electrolytic coating by anodisation C25D 9/00)}
4/02	. Electrodes composed of, or comprising, active material	4/0445	. . . . . {Forming after manufacture of the electrode, e.g. first charge, cycling}
2004/021	. . {Physical characteristics, e.g. porosity, surface area}	4/0447	. . . . . {of complete cells or cells stacks}
2004/022	. . {Electrodes made of one single microscopic fiber}	4/045	. . . . {Electrochemical coating; Electrochemical impregnation}
2004/023	. . {Gel electrode}	4/0452	. . . . . {from solutions}
2004/024	. . {Insertable electrodes}	4/0454	. . . . . {from melts}
2004/025	. . {with shapes other than plane or cylindrical}	4/0457	. . . . . {from dispersions or suspensions; Electrophoresis}
2004/026	. . {characterised by the polarity}	4/0459	. . . . . {Electrochemical doping, intercalation, occlusion or alloying}
2004/027	. . . {Negative electrodes}	4/0461	. . . . . {Electrochemical alloying}
2004/028	. . . {Positive electrodes}	4/0464	. . . . . {Electro organic synthesis}
2004/029	. . . {Bipolar electrodes}	4/0466	. . . . . {Electrochemical polymerisation}
4/04	. . Processes of manufacture in general	4/0469	. . . . . {Electroforming a self-supporting electrode; Electroforming of powdered electrode material}
4/0402	. . . {Methods of deposition of the material}	4/0471	. . . . {involving thermal treatment, e.g. firing, sintering, backing particulate active material, thermal decomposition, pyrolysis}
4/0404	. . . . {by coating on electrode collectors}	4/0473	. . . . {Filling tube-or pockets type electrodes; Applying active mass in cup-shaped terminals}
4/0407	. . . . {by coating on an electrolyte layer}	4/0476	. . . . . {with molten material}
4/0409	. . . . {by a doctor blade method, slip-casting or roller coating}	4/0478	. . . . . {with dispersions, suspensions or pastes}
4/0411	. . . . {by extrusion}	4/048	. . . . . {with dry powder}
4/0414	. . . . {by screen printing}	4/0483	. . . . {by methods including the handling of a melt (H01M 4/0438, take precedence)}
4/0416	. . . . {involving impregnation with a solution, dispersion, paste or dry powder (H01M 4/0438 takes precedence)}	4/0485	. . . . . {Casting}
4/0419	. . . . . {involving spraying}	4/0488	. . . . . {Alloying}
4/0421	. . . . . {involving vapour deposition}	4/049	. . . . {Manufacturing of an active layer by chemical means}
4/0423	. . . . . {Physical vapour deposition}	4/0492	. . . . . {Chemical attack of the support material}
4/0426	. . . . . {Sputtering}	4/0495	. . . . . {Chemical alloying}
4/0428	. . . . . {Chemical vapour deposition}	4/0497	. . . . . {Chemical precipitation}
4/043	. . . {involving compressing or compaction}	4/06	. . Electrodes for primary cells
4/0433	. . . . {Molding}	4/08	. . . Processes of manufacture
4/0435	. . . . {Rolling or calendering}		

4/10	. . . . of pressed electrodes with central core, i.e. dollies	4/368	. . . . {Liquid depolarisers}
4/12	. . . . of consumable metal or alloy electrodes (use of alloy compositions as active materials H01M 4/38)	4/38	. . . . of elements or alloys
4/13	. . Electrodes for accumulators with non-aqueous electrolyte, e.g. for lithium-accumulators; Processes of manufacture thereof	4/381	. . . . {Alkaline or alkaline earth metals elements (H01M 4/40 takes precedence)}
	NOTE	4/382	. . . . . {Lithium (H01M 4/405 takes precedence)}
	This group does not cover electrodes for accumulators working at high temperatures, e.g. molten sodium electrodes, which subject matter is classified in group H01M 10/39	4/383	. . . . . {Hydrogen absorbing alloys}
4/131	. . . Electrodes based on mixed oxides or hydroxides, or on mixtures of oxides or hydroxides, e.g. LiCoOx	4/385	. . . . . {of the type LaNi ₅ }
4/1315	. . . . containing halogen atoms, e.g. LiCoOxFy	4/386	. . . . . {Silicon or alloys based on silicon}
4/133	. . . Electrodes based on carbonaceous material, e.g. graphite-intercalation compounds or CFx	4/387	. . . . . {Tin or alloys based on tin}
4/134	. . . Electrodes based on metals, Si or alloys	4/388	. . . . . {Halogens}
4/136	. . . Electrodes based on inorganic compounds other than oxides or hydroxides, e.g. sulfides, selenides, tellurides, halogenides or LiCoFy	4/40	. . . . . Alloys based on alkali metals
4/137	. . . Electrodes based on electro-active polymers	4/405	. . . . . {Alloys based on lithium}
4/139	. . . Processes of manufacture	4/42	. . . . . Alloys based on zinc
4/1391	. . . . of electrodes based on mixed oxides or hydroxides, or on mixtures of oxides or hydroxides, e.g. LiCoOx	4/44	. . . . . Alloys based on cadmium
4/13915	. . . . . containing halogen atoms, e.g. LiCoOxFy	4/46	. . . . . Alloys based on magnesium or aluminium
4/1393	. . . . of electrodes based on carbonaceous material, e.g. graphite-intercalation compounds or CFx	4/463	. . . . . {Aluminium based}
4/1395	. . . . of electrodes based on metals, Si or alloys	4/466	. . . . . {Magnesium based}
4/1397	. . . . of electrodes based on inorganic compounds other than oxides or hydroxides, e.g. sulfides, selenides, tellurides, halogenides or LiCoFy	4/48	. . . of inorganic oxides or hydroxides
4/1399	. . . . of electrodes based on electro-active polymers	4/481	. . . . {of mercury}
4/14	. . Electrodes for lead-acid accumulators	4/483	. . . . {for non-aqueous cells (H01M 4/485 takes precedence)}
4/16	. . . Processes of manufacture	4/485	. . . . of mixed oxides or hydroxides for inserting or intercalating light metals, e.g. LiTi ₂ O ₄ or LiTi ₂ OxFy (H01M 4/505 , H01M 4/525 take precedence)
4/18	. . . . of Planté electrodes	4/50	. . . . of manganese
4/20	. . . . of pasted electrodes	4/502	. . . . . {for non-aqueous cells (H01M 4/505 takes precedence)}
4/21	. . . . . Drying of pasted electrodes	4/505	. . . . . of mixed oxides or hydroxides containing manganese for inserting or intercalating light metals, e.g. LiMn ₂ O ₄ or LiMn ₂ OxFy
4/22	. . . . Forming of electrodes	4/52	. . . . of nickel, cobalt or iron
4/23	. . . . . Drying or preserving electrodes after forming	4/521	. . . . . {of iron for aqueous cells}
4/24	. . Electrodes for alkaline accumulators	4/523	. . . . . {for non-aqueous cells (H01M 4/525 takes precedence)}
4/242	. . . {Hydrogen storage electrodes}	4/525	. . . . . of mixed oxides or hydroxides containing iron, cobalt or nickel for inserting or intercalating light metals, e.g. LiNiO ₂ , LiCoO ₂ or LiCoOxFy
4/244	. . . {Zinc electrodes}	4/54	. . . . of silver
4/246	. . . {Cadmium electrodes}	4/56	. . . . of lead
4/248	. . . {Iron electrodes}	4/57	. . . . . of "grey lead", i.e. powders containing lead and lead oxide
4/26	. . . Processes of manufacture	4/58	. . . of inorganic compounds other than oxides or hydroxides, e.g. sulfides, selenides, tellurides, halogenides or LiCoFy; of polyanionic structures, e.g. phosphates, silicates or borates
4/28	. . . . Precipitating active material on the carrier	4/5805	. . . . . {Phosphides}
4/29	. . . . . by electrochemical methods	4/581	. . . . . {Chalcogenides or intercalation compounds thereof}
4/30	. . . . Pressing	4/5815	. . . . . {Sulfides}
4/32	. . . Nickel oxide or hydroxide electrodes	4/582	. . . . . {Halogenides}
4/34	. . . Silver oxide or hydroxide electrodes	4/5825	. . . . . {Oxygenated metallic salts or polyanionic structures, e.g. borates, phosphates, silicates, olivines}
4/36	. . Selection of substances as active materials, active masses, active liquids		NOTE
4/362	. . . {Composites}		Polyanionic structures comprises elements not changing oxidation state during electrochemical reaction, e.g. P, Si, B
4/364	. . . . {as mixtures}	4/583	. . . . Carbonaceous material, e.g. graphite-intercalation compounds or CFx
4/366	. . . . {as layered products}		

4/5835	. . . . . {Comprising fluorine or fluoride salts}	4/806	. . . . . {Nonwoven fibrous fabric containing only fibres}
4/587	. . . . . for inserting or intercalating light metals	4/808	. . . . . {Foamed, spongy materials}
4/60	. . . of organic compounds	4/82	. . . Multi-step processes for manufacturing carriers for lead-acid accumulators
4/602	. . . . . {Polymers}	4/84	. . . . . involving casting
4/604	. . . . . {containing aliphatic main chain polymers}	4/86	. Inert electrodes with catalytic activity, e.g. for fuel cells
4/606	. . . . . {containing aromatic main chain polymers}	4/8605	. . {Porous electrodes}
4/608	. . . . . {containing heterocyclic rings}	4/861	. . . {with a gradient in the porosity}
4/62	. . Selection of inactive substances as ingredients for active masses, e.g. binders, fillers	4/8615	. . . {Bifunctional electrodes for rechargeable cells}
4/621	. . . {Binders}	4/8621	. . . {containing only metallic or ceramic material, e.g. made by sintering or sputtering}
4/622	. . . . {being polymers}	4/8626	. . . {characterised by the form}
4/623	. . . . . {fluorinated polymers}	4/8631	. . . . {Bipolar electrodes}
4/624	. . . {Electric conductive fillers}	4/8636	. . {with a gradient in another property than porosity (H01M 4/861 takes precedence)}
4/625	. . . . {Carbon or graphite}	4/8642	. . . {Gradient in composition}
4/626	. . . . {Metals}	4/8647	. . {consisting of more than one material, e.g. consisting of composites}
4/627	. . . {Expanders for lead-acid accumulators}	4/8652	. . . {as mixture}
4/628	. . . {Inhibitors, e.g. gassing inhibitors, corrosion inhibitors}	4/8657	. . . {layered}
4/64	. . Carriers or collectors	4/8663	. . {Selection of inactive substances as ingredients for catalytic active masses, e.g. binders, fillers}
4/66	. . . Selection of materials	4/8668	. . . {Binders}
4/661	. . . . {Metal or alloys, e.g. alloy coatings (H01M 4/669 take precedence)}	4/8673	. . . {Electrically conductive fillers}
4/662	. . . . . {Alloys (collectors of lead alloys (H01M 4/685))}	2004/8678	. . {characterised by the polarity}
4/663	. . . . {containing carbon or carbonaceous materials as conductive part, e.g. graphite, carbon fibres}	2004/8684	. . . {Negative electrodes}
4/664	. . . . {Ceramic materials}	2004/8689	. . . {Positive electrodes}
4/665	. . . . {Composites}	2004/8694	. . . {Bipolar electrodes}
4/666	. . . . . {in the form of mixed materials (H01M 4/668 takes precedence)}	4/88	. . Processes of manufacture
4/667	. . . . . {in the form of layers, e.g. coatings}	4/8803	. . . {Supports for the deposition of the catalytic active composition (H01M 4/90 takes precedence)}
4/668	. . . . {Composites of electroconductive material and synthetic resins}	4/8807	. . . . {Gas diffusion layers}
4/669	. . . . {Steels}	4/881	. . . . {Electrolytic membranes}
4/68	. . . . for use in lead-acid accumulators	4/8814	. . . . {Temporary supports, e.g. decal}
4/685	. . . . . {Lead alloys}	4/8817	. . . {Treatment of supports before application of the catalytic active composition (coated porous composites H01M 8/0245)}
4/70	. . . characterised by shape or form	4/8821	. . . . {Wet proofing}
4/72	. . . . Grids	4/8825	. . . {Methods for deposition of the catalytic active composition}
4/73	. . . . . for lead-acid accumulators, e.g. frame plates	4/8828	. . . . {Coating with slurry or ink}
4/74	. . . . . Meshes or woven material; Expanded metal	4/8832	. . . . . {Ink jet printing}
4/742	. . . . . {perforated material}	4/8835	. . . . . {Screen printing}
4/745	. . . . . {Expanded metal}	4/8839	. . . . . {Painting}
4/747	. . . . . {Woven material}	4/8842	. . . . {Coating using a catalyst salt precursor in solution followed by evaporation and reduction of the precursor}
4/75	. . . . Wires, rods or strips	4/8846	. . . . {Impregnation}
4/76	. . . . Containers for holding the active material, e.g. tubes, capsules	4/885	. . . . . {followed by reduction of the catalyst salt precursor}
4/762	. . . . . {Porous or perforated metallic containers}	4/8853	. . . . {Electrodeposition}
4/765	. . . . . {Tubular type or pencil type electrodes; tubular or multitubular sheaths or covers of insulating material for said tubular-type electrodes}	4/8857	. . . . {Casting, e.g. tape casting, vacuum slip casting}
4/767	. . . . . {Multitubular sheaths or covers}	4/886	. . . . {Powder spraying, e.g. wet or dry powder spraying, plasma spraying}
4/78	. . . . Shapes other than plane or cylindrical, e.g. helical	4/8864	. . . . {Extrusion}
4/80	. . . . Porous plates, e.g. sintered carriers	4/8867	. . . . {Vapour deposition}
4/801	. . . . . {Sintered carriers}	4/8871	. . . . . {Sputtering}
4/803	. . . . . {of only powdered material}		
4/805	. . . . . {of powdered and fibrous material}		

4/8875	. . . {Methods for shaping the electrode into free-standing bodies, like sheets, films or grids, e.g. moulding, hot-pressing, casting without support, extrusion without support}	6/04	. Cells with aqueous electrolyte
4/8878	. . . {Treatment steps after deposition of the catalytic active composition or after shaping of the electrode being free-standing body}	6/045	. . {characterised by aqueous electrolyte}
4/8882	. . . . {Heat treatment, e.g. drying, baking}	6/06	. . Dry cells, i.e. cells wherein the electrolyte is rendered non-fluid
4/8885	. . . . . {Sintering or firing}	6/08	. . . with cup-shaped electrodes
4/8889	. . . . . {Cosintering or cofiring of a catalytic active layer with another type of layer}	6/085	. . . . {of the reversed type, i.e. anode in the centre}
4/8892	. . . . {Impregnation or coating of the catalyst layer, e.g. by an ionomer}	6/10	. . . with wound or folded electrodes
4/8896	. . . . {Pressing, rolling, calendering (membrane electrode assemblies H01M 8/1004)}	6/103	. . . . {Cells with electrode of only one polarity being folded or wound}
4/90	. . Selection of catalytic material	2006/106	. . . . {Elliptic wound cells}
4/9008	. . . {Organic or organo-metallic compounds}	6/12	. . . with flat electrodes
4/9016	. . . {Oxides, hydroxides or oxygenated metallic salts}	6/14	. Cells with non-aqueous electrolyte
4/9025	. . . . {Oxides specially used in fuel cell operating at high temperature, e.g. SOFC}	6/145	. . {containing ammonia}
4/9033	. . . . . {Complex oxides, optionally doped, of the type M1MeO3, M1 being an alkaline earth metal or a rare earth, Me being a metal, e.g. perovskites}	6/16	. . with organic electrolyte (H01M 6/18 takes precedence)
4/9041	. . . {Metals or alloys (H01M 4/92 takes precedence)}	6/162	. . . {characterised by the electrolyte}
4/905	. . . . {specially used in fuel cell operating at high temperature, e.g. SOFC}	6/164	. . . . {by the solvent}
4/9058	. . . . . {of noble metals or noble-metal based alloys}	6/166	. . . . {by the solute}
4/9066	. . . . . {of metal-ceramic composites or mixtures, e.g. cermets}	6/168	. . . . {by additives}
4/9075	. . . {Catalytic material supported on carriers, e.g. powder carriers (H01M 4/8807 , H01M 4/881 , H01M 4/8814 , H01M 4/925 take precedence)}	6/18	. . with solid electrolyte
4/9083	. . . . {on carbon or graphite}	6/181	. . . {with polymeric electrolytes}
4/9091	. . . {Unsupported catalytic particles; loose particulate catalytic materials, e.g. in fluidised state}	6/182	. . . {with halogenide as solid electrolyte}
4/92	. . . Metals of platinum group (H01M 4/94 {, H01M 4/9058 } take precedence)	6/183	. . . . {with fluoride as solid electrolyte}
4/921	. . . . {Alloys or mixtures with metallic elements}	6/185	. . . {with oxides, hydroxides or oxysalts as solid electrolytes}
4/923	. . . . {Compounds thereof with non-metallic elements}	6/186	. . . . {Only oxysalts-containing solid electrolytes}
4/925	. . . . {supported on carriers, e.g. powder carriers}	6/187	. . . {Solid electrolyte characterised by the form}
4/926	. . . . . {on carbon or graphite}	6/188	. . . {Processes of manufacture}
4/928	. . . . {Unsupported catalytic particles; loose particulate catalytic materials, e.g. in fluidised state}	6/20	. . . working at high temperature (deferred-action thermal cells H01M 6/36)
4/94	. . Non-porous diffusion electrodes, e.g. palladium membranes, ion exchange membranes	6/22	. Immobilising of electrolyte
4/96	. . Carbon-based electrodes	6/24	. Cells comprising two different electrolytes
4/98	. . Raney-type electrodes	6/26	. Cells without oxidising active material, e.g. Volta cells
6/00	Primary cells; Manufacture thereof	6/28	. Standard cells, e.g. Weston cells
	NOTE	6/30	. Deferred-action cells
	In this group, primary cells are electrochemical generators in which the cell energy is present in chemical form and is not regenerated.	6/32	. . activated through external addition of electrolyte or of electrolyte components
6/005	. {Devices for making primary cells}	6/34	. . . Immersion cells, e.g. sea-water cells
6/02	. Details (of electrodes H01M 4/00 ; of non-active parts H01M 50/00)	6/36	. . containing electrolyte and made operational by physical means, e.g. thermal cells
		6/38	. . . by mechanical means
		6/385	. . . . {by insertion of electrodes}
		6/40	. Printed batteries {, e.g. thin film batteries}
		6/42	. Grouping of primary cells into batteries (H01M 6/40 takes precedence)
		6/425	. . {Multimode batteries, batteries with "reserve cells"}
		6/44	. . of tubular or cup-shaped cells
		6/46	. . of flat cells
		6/48	. . . with bipolar electrodes
		6/485	. . . . {Side-by-side bipolar batteries}

- 6/50 . . . Methods or arrangements for servicing or maintenance, e.g. for maintaining operating temperature ([constructional details of current conducting connections for detecting conditions inside cells or batteries, e.g. details of voltage sensing terminals, H01M 50/569](#))

WARNING

Group [H01M 6/50](#) is impacted by reclassification into group [H01M 50/569](#).

Groups [H01M 6/50](#) and [H01M 50/569](#) should be considered in order to perform a complete search.

- 6/5005 . . . {Auxiliary electrodes}
 6/5011 . . . {for several cells simultaneously or successively}
 6/5016 . . . {Multimode utilisation}
 6/5022 . . . {Arrangements for moving electrodes or separating elements}
 6/5027 . . . {Dummy cells}
 6/5033 . . . {used as charging means for another battery}
 6/5038 . . . {Heating or cooling of cells or batteries}
 6/5044 . . . {Cells or batteries structurally combined with cell condition indicating means}

WARNING

Group [H01M 6/5044](#) is incomplete pending reclassification of documents from group [H01M 50/572](#).

Group [H01M 6/5044](#) is also impacted by reclassification into group [H01M 50/569](#).

Groups [H01M 50/572](#), [H01M 6/5044](#), and [H01M 50/569](#) should be considered in order to perform a complete search.

- 6/505 . . . {Cells combined with indicating means for external visualization of the condition, e.g. by change of colour or of light intensity}

WARNING

Group [H01M 6/505](#) is impacted by reclassification into group [H01M 50/569](#).

Groups [H01M 6/505](#) and [H01M 50/569](#) should be considered in order to perform a complete search.

- 6/5055 . . . {End of discharge indicated by a voltage step}

WARNING

Group [H01M 6/5055](#) is impacted by reclassification into group [H01M 50/569](#).

Groups [H01M 6/5055](#) and [H01M 50/569](#) should be considered in order to perform a complete search.

- 6/5061 . . . {Cells combined with sound indicating means}

WARNING

Group [H01M 6/5061](#) is impacted by reclassification into group [H01M 50/569](#).

Groups [H01M 6/5061](#) and [H01M 50/569](#) should be considered in order to perform a complete search.

- 6/5066 . . . {Type recognition}
 6/5072 . . . {Preserving or storing cells}

- 6/5077 . . . {Regeneration of reactants or electrolyte}
 6/5083 . . . {Testing apparatus}
 6/5088 . . . {Initial activation; predischARGE; Stabilisation of initial voltage}
 2006/5094 . . . {Aspects relating to capacity ratio of electrolyte/electrodes or anode/cathode}

- 6/52 . . . Reclaiming serviceable parts of waste cells or batteries {, e.g. recycling}

8/00 Fuel cells; Manufacture thereof**NOTE**

In this group, the following expression is used with the meaning indicated:

- "Fuel cell" means an electrochemical generator wherein the reactants are supplied from outside.

- 8/002 . . . {Shape, form of a fuel cell}
 8/004 . . . {Cylindrical, tubular or wound}
 8/006 . . . {Flat}
 8/008 . . . Disposal or recycling of fuel cells
 8/02 . . . Details ([electrodes H01M 4/86 - H01M 4/98](#))
 8/0202 . . . Collectors; Separators, e.g. bipolar separators; Interconnectors
 8/0204 Non-porous and characterised by the material
 8/0206 Metals or alloys
 8/0208 Alloys
 8/021 Alloys based on iron
 8/0213 Gas-impermeable carbon-containing materials
 8/0215 Glass; Ceramic materials
 8/0217 Complex oxides, optionally doped, of the type AMO₃, A being an alkaline earth metal or rare earth metal and M being a metal, e.g. perovskites
 8/0219 {Chromium complex oxides}
 8/0221 Organic resins; Organic polymers
 8/0223 Composites
 8/0226 in the form of mixtures
 8/0228 in the form of layered or coated products
 8/023 . . . Porous and characterised by the material
 8/0232 Metals or alloys
 8/0234 Carbonaceous material
 8/0236 Glass; Ceramics; Cermets
 8/0239 Organic resins; Organic polymers
 8/0241 Composites
 8/0243 in the form of mixtures
 8/0245 in the form of layered or coated products
 8/0247 . . . characterised by the form ([characterised by a channel configuration H01M 8/0258](#))
 8/025 semicylindrical
 8/0252 tubular
 8/0254 corrugated or undulated
 8/0256 Vias, i.e. connectors passing through the separator material
 8/0258 . . . characterised by the configuration of channels, e.g. by the flow field of the reactant or coolant
 8/026 characterised by grooves, e.g. their pitch or depth
 8/0263 having meandering or serpentine paths
 8/0265 the reactant or coolant channels having varying cross sections
 8/0267 . . . having heating or cooling means, e.g. heaters or coolant flow channels

- 8/0269 . . . {Separators, collectors or interconnectors including a printed circuit board}
- 8/0271 . . Sealing or supporting means around electrodes, matrices or membranes
- 8/0273 . . . with sealing or supporting means in the form of a frame
- 8/0276 . . . Sealing means characterised by their form ([H01M 8/0273 takes precedence](#))
- 8/0278 {O-rings}
- 8/028 . . . Sealing means characterised by their material
- 8/0282 Inorganic material
- 8/0284 Organic resins; Organic polymers
- 8/0286 . . . Processes for forming seals
- 8/0289 . . Means for holding the electrolyte (solid polymer electrolytes [H01M 8/1018](#))
- 8/0293 . . . Matrices for immobilising electrolyte solutions
- 8/0295 . . . Matrices for immobilising electrolyte melts
- 8/0297 . . Arrangements for joining electrodes, reservoir layers, heat exchange units or bipolar separators to each other ([H01M 8/0271 takes precedence](#))
- 8/04 . . Auxiliary arrangements, e.g. for control of pressure or for circulation of fluids
- 8/04007 . . related to heat exchange
- 8/04014 . . . Heat exchange using gaseous fluids; Heat exchange by combustion of reactants
- 8/04022 {Heating by combustion}
- 8/04029 . . . Heat exchange using liquids
- 8/04037 . . . {Electrical heating}
- 8/04044 . . . Purification of heat exchange media
- 8/04052 . . . {Storage of heat in the fuel cell system}
- 8/04059 . . . {Evaporative processes for the cooling of a fuel cell}
- 8/04067 . . . {Heat exchange or temperature measuring elements, thermal insulation, e.g. heat pipes, heat pumps, fins}
- 8/04074 {Heat exchange unit structures specially adapted for fuel cell}
- 8/04082 . . Arrangements for control of reactant parameters, e.g. pressure or concentration
- 8/04089 . . . of gaseous reactants
- 8/04097 {with recycling of the reactants ([H01M 8/04119](#), [H01M 8/04104 take precedence](#))}
- 8/04104 {Regulation of differential pressures}
- 8/04111 using a compressor turbine assembly
- 8/04119 with simultaneous supply or evacuation of electrolyte; Humidifying or dehumidifying
- 8/04126 {Humidifying}
- 8/04134 {by coolants}
- 8/04141 {by water containing exhaust gases}
- 8/04149 {by diffusion, e.g. making use of membranes}
- 8/04156 {with product water removal}
- 8/04164 {by condensers, gas-liquid separators or filters}
- 8/04171 {using adsorbents, wicks or hydrophilic material}
- 8/04179 {by purging or increasing flow or pressure of reactants}
- 8/04186 . . . of liquid-charged or electrolyte-charged reactants
- 8/04194 {Concentration measuring cells}
- 8/04197 . . . {Preventing means for fuel crossover}
- 8/04201 . . . {Reactant storage and supply, e.g. means for feeding, pipes}
- 8/04208 {Cartridges, cryogenic media or cryogenic reservoirs}
- 8/04216 {characterised by the choice for a specific material, e.g. carbon, hydride, absorbent}
- 8/04223 . . during start-up or shut-down; Depolarisation or activation, e.g. purging; Means for short-circuiting defective fuel cells
- 8/04225 . . . during start-up
- 8/04228 . . . during shut-down
- 8/04231 . . . {Purging of the reactants}
- 8/04238 . . . {Depolarisation}
- 8/04246 . . . {Short circuiting means for defective fuel cells (detection of defective fuel cells [H01M 8/04664](#), methods for shunting fuel cells [H01M 8/04955](#))}
- 8/04253 . . . {Means for solving freezing problems}
- 8/04268 . . . {Heating of fuel cells during the start-up of the fuel cells}
- 8/04276 . . Arrangements for managing the electrolyte stream, e.g. heat exchange
- 8/04283 . . . {Supply means of electrolyte to or in matrix-fuel cells}
- 8/04291 . . Arrangements for managing water in solid electrolyte fuel cell systems ([H01M 8/04119 takes precedence](#))
- 8/04298 . . Processes for controlling fuel cells or fuel cell systems
- 8/043 . . . applied during specific periods
- 8/04302 applied during start-up
- 8/04303 applied during shut-down
- 8/04305 {Modeling, demonstration models of fuel cells, e.g. for training purposes}
- 8/04313 . . . characterised by the detection or assessment of variables; characterised by the detection or assessment of failure or abnormal function
- 8/0432 Temperature; Ambient temperature
- 8/04328 {of anode reactants at the inlet or inside the fuel cell}
- 8/04335 {of cathode reactants at the inlet or inside the fuel cell}
- 8/04343 {of anode exhausts}
- 8/0435 {of cathode exhausts}
- 8/04358 {of the coolant}
- 8/04365 {of other components of a fuel cell or fuel cell stacks}
- 8/04373 {of auxiliary devices, e.g. reformers, compressors, burners}
- 8/0438 Pressure; Ambient pressure; Flow
- 8/04388 {of anode reactants at the inlet or inside the fuel cell}
- 8/04395 {of cathode reactants at the inlet or inside the fuel cell}
- 8/04402 {of anode exhausts}
- 8/0441 {of cathode exhausts}
- 8/04417 {of the coolant}
- 8/04425 {at auxiliary devices, e.g. reformers, compressors, burners}
- 8/04432 {Pressure differences, e.g. between anode and cathode}
- 8/0444 Concentration; Density ([H01M 8/04492 takes precedence](#))

8/04447	. . . . .	{ of anode reactants at the inlet or inside the fuel cell }	8/04805	. . . . .	{ of fuel cell exhausts }
8/04455	. . . . .	{ of cathode reactants at the inlet or inside the fuel cell }	8/04813	. . . . .	{ of the coolant }
8/04462	. . . . .	{ of anode exhausts }	8/0482	. . . . .	{ of the electrolyte }
8/0447	. . . . .	{ of cathode exhausts }	8/04828	. . . . .	Humidity; Water content
8/04477	. . . . .	{ of the electrolyte }	8/04835	. . . . .	{ of fuel cell reactants }
8/04485	. . . . .	{ of the coolant }	8/04843	. . . . .	{ of fuel cell exhausts }
8/04492	. . . . .	Humidity; Ambient humidity; Water content	8/0485	. . . . .	{ of the electrolyte }
8/045	. . . . .	{ of anode reactants at the inlet or inside the fuel cell }	8/04858	. . . . .	Electric variables
8/04507	. . . . .	{ of cathode reactants at the inlet or inside the fuel cell }	8/04865	. . . . .	{ Voltage }
8/04514	. . . . .	{ of anode exhausts }	8/04873	. . . . .	{ of the individual fuel cell }
8/04522	. . . . .	{ of cathode exhausts }	8/0488	. . . . .	{ of fuel cell stacks }
8/04529	. . . . .	{ of the electrolyte }	8/04888	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }
8/04537	. . . . .	Electric variables	8/04895	. . . . .	{ Current }
8/04544	. . . . .	{ Voltage }	8/04902	. . . . .	{ of the individual fuel cell }
8/04552	. . . . .	{ of the individual fuel cell }	8/0491	. . . . .	{ of fuel cell stacks }
8/04559	. . . . .	{ of fuel cell stacks }	8/04917	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }
8/04567	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }	8/04925	. . . . .	{ Power, energy, capacity or load }
8/04574	. . . . .	{ Current }	8/04932	. . . . .	{ of the individual fuel cell }
8/04582	. . . . .	{ of the individual fuel cell }	8/0494	. . . . .	{ of fuel cell stacks }
8/04589	. . . . .	{ of fuel cell stacks }	8/04947	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }
8/04597	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }	8/04949	. . . . .	{ other electric variables, e.g. resistance or impedance }
8/04604	. . . . .	{ Power, energy, capacity or load }	8/04951	. . . . .	{ of the individual fuel cell }
8/04611	. . . . .	{ of the individual fuel cell }	8/04952	. . . . .	{ of fuel cell stacks }
8/04619	. . . . .	{ of fuel cell stacks }	8/04953	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }
8/04626	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }	8/04955	. . . . .	Shut-off or shut-down of fuel cells
8/04634	. . . . .	{ Other electric variables, e.g. resistance or impedance }	8/04992	. . . . .	characterised by the implementation of mathematical or computational algorithms, e.g. feedback control loops, fuzzy logic, neural networks or artificial intelligence
8/04641	. . . . .	{ of the individual fuel cell }	8/06	. . . . .	Combination of fuel cells with means for production of reactants or for treatment of residues (regenerative fuel cells H01M 8/18)
8/04649	. . . . .	{ of fuel cell stacks }	8/0606	. . . . .	with means for production of gaseous reactants
8/04656	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }	8/0612	. . . . .	from carbon-containing material
8/04664	. . . . .	Failure or abnormal function	8/0618	. . . . .	{ Reforming processes, e.g. autothermal, partial oxidation or steam reforming }
8/04671	. . . . .	{ of the individual fuel cell }	8/0625	. . . . .	{ in a modular combined reactor/fuel cell structure }
8/04679	. . . . .	{ of fuel cell stacks }	8/0631	. . . . .	{ Reactor construction specially adapted for combination reactor/fuel cell (hydrogen C01B 3/00 ; reactors for physicochemical processes B01J 19/00) }
8/04686	. . . . .	{ of auxiliary devices, e.g. batteries, capacitors }	8/0637	. . . . .	Direct internal reforming at the anode of the fuel cell
8/04694	. . . . .	characterised by variables to be controlled	8/0643	. . . . .	{ Gasification of solid fuel }
8/04701	. . . . .	Temperature	8/065	. . . . .	by dissolution of metals or alloys; by dehydrating metallic substances
8/04708	. . . . .	{ of fuel cell reactants }	8/0656	. . . . .	by electrochemical means (H01M 8/065 takes precedence)
8/04716	. . . . .	{ of fuel cell exhausts }	8/0662	. . . . .	Treatment of gaseous reactants or gaseous residues, e.g. cleaning
8/04723	. . . . .	{ of the coolant }	8/0668	. . . . .	Removal of carbon monoxide or carbon dioxide
8/04731	. . . . .	{ of other components of a fuel cell or fuel cell stacks }	8/0675	. . . . .	{ Removal of sulfur }
8/04738	. . . . .	{ of auxiliary devices, e.g. reformer, compressor, burner }	8/0681	. . . . .	{ Reactant purification by the use of electrochemical cells }
8/04746	. . . . .	Pressure; Flow	8/0687	. . . . .	{ Reactant purification by the use of membranes or filters }
8/04753	. . . . .	{ of fuel cell reactants }			
8/04761	. . . . .	{ of fuel cell exhausts }			
8/04768	. . . . .	{ of the coolant }			
8/04776	. . . . .	{ at auxiliary devices, e.g. reformer, compressor, burner }			
8/04783	. . . . .	{ Pressure differences, e.g. between anode and cathode }			
8/04791	. . . . .	Concentration; Density (H01M 8/04828 takes precedence)			
8/04798	. . . . .	{ of fuel cell reactants }			

- 8/0693 . . . {Treatment of the electrolyte residue, e.g. reconcentrating}
- 8/08 . Fuel cells with aqueous electrolytes
- 8/083 . . Alkaline fuel cells
- 8/086 . . Phosphoric acid fuel cells [PAFC]
- 8/10 . Fuel cells with solid electrolytes
- 8/1004 . . characterised by membrane-electrode assemblies [MEA] (H01M 8/12 takes precedence)
- 8/1006 . . . Corrugated, curved or wave-shaped MEA
- 8/1007 . . with both reactants being gaseous or vaporised (H01M 8/12 takes precedence)
- 8/1009 . . with one of the reactants being liquid, solid or liquid-charged (H01M 8/12 takes precedence)
- 8/1011 . . . Direct alcohol fuel cells [DAFC], e.g. direct methanol fuel cells [DMFC]
- 8/1013 {Other direct alcohol fuel cells [DAFC]}
- 8/1016 . . characterised by the electrolyte material (H01M 8/12 takes precedence)
- 8/1018 . . . Polymeric electrolyte materials
- 8/102 characterised by the chemical structure of the main chain of the ion-conducting polymer
- NOTE**
- When classifying in this group, structures having two or more heteroatoms belonging to the groups O, P, N, S or Si must be completely identified by classification in all relevant subgroups.
- 8/1023 having only carbon, e.g. polyarylenes, polystyrenes or polybutadiene-styrenes
- 8/1025 having only carbon and oxygen, e.g. polyethers, sulfonated polyetheretherketones [S-PEEK], sulfonated polysaccharides, sulfonated celluloses or sulfonated polyesters
- 8/1027 having carbon, oxygen and other atoms, e.g. sulfonated polyethersulfones [S-PES]
- 8/103 having nitrogen, e.g. sulfonated polybenzimidazoles [S-PBI], polybenzimidazoles with phosphoric acid, sulfonated polyamides [S-PA] or sulfonated polyphosphazenes [S-PPh]
- 8/1032 having sulfur, e.g. sulfonated-polyethersulfones [S-PES]
- 8/1034 having phosphorus, e.g. sulfonated polyphosphazenes [S-PPh]
- 8/1037 having silicon, e.g. sulfonated crosslinked polydimethylsiloxanes
- 8/1039 halogenated, e.g. sulfonated polyvinylidene fluorides
- 8/1041 Polymer electrolyte composites, mixtures or blends
- 8/1044 Mixtures of polymers, of which at least one is ionically conductive
- 8/1046 Mixtures of at least one polymer and at least one additive
- 8/1048 Ion-conducting additives, e.g. ion-conducting particles, heteropolyacids, metal phosphate or polybenzimidazole with phosphoric acid
- 8/1051 Non-ion-conducting additives, e.g. stabilisers, SiO₂ or ZrO₂
- 8/1053 consisting of layers of polymers with at least one layer being ionically conductive
- 8/1055 {Inorganic layers on the polymer electrolytes, e.g. inorganic coatings}
- 8/1058 characterised by a porous support having no ion-conducting properties
- 8/106 characterised by the chemical composition of the porous support
- 8/1062 characterised by the physical properties of the porous support, e.g. its porosity or thickness
- 8/1065 characterised by the form, e.g. perforated or wave-shaped
- 8/1067 characterised by their physical properties, e.g. porosity, ionic conductivity or thickness
- 8/1069 characterised by the manufacturing processes
- 8/1072 by chemical reactions, e.g. *insitu* polymerisation or *insitu* crosslinking
- 8/1074 {Sol-gel processes}
- 8/1076 {Micromachining techniques, e.g. masking, etching steps or photolithography}
- 8/1079 {Inducing porosity into non porous precursors membranes, e.g. leaching, pore stretching}
- 8/1081 starting from solutions, dispersions or slurries exclusively of polymers
- 8/1083 {Starting from polymer melts other than monomer melts}
- 8/1086 After-treatment of the membrane other than by polymerisation
- 8/1088 Chemical modification, e.g. sulfonation
- 8/109 {thermal other than drying, e.g. sintering}
- 8/1093 {mechanical, e.g. pressing, puncturing}
- 2008/1095 . . {Fuel cells with polymeric electrolytes}
- 8/1097 . . Fuel cells applied on a support, e.g. miniature fuel cells deposited on silica supports
- 8/12 . . operating at high temperature, e.g. with stabilised ZrO₂ electrolyte
- 8/1213 . . . characterised by the electrode/electrolyte combination or the supporting material
- 8/122 Corrugated, curved or wave-shaped MEA
- 8/1226 characterised by the supporting layer
- 8/1231 . . . with both reactants being gaseous or vaporised
- 8/1233 . . . with one of the reactants being liquid, solid or liquid-charged
- 8/124 . . . characterised by the process of manufacturing or by the material of the electrolyte
- 8/1246 the electrolyte consisting of oxides
- 8/1253 the electrolyte containing zirconium oxide
- 8/126 the electrolyte containing cerium oxide
- 8/1266 {the electrolyte containing bismuth oxide}
- 8/1273 {Fuel cells with solid halide electrolytes}
- 2008/128 . . . {Fuel cells with solid halide electrolytes}
- 8/1286 . . . Fuel cells applied on a support, e.g. miniature fuel cells deposited on silica supports
- 2008/1293 . . . {Fuel cells with solid oxide electrolytes}
- 8/14 . Fuel cells with fused electrolytes
- 8/141 . . {the anode and the cathode being gas-permeable electrodes or electrode layers}
- 8/142 . . . {with matrix-supported or semi-solid matrix-reinforced electrolyte}
- 8/143 . . {with liquid, solid or electrolyte-charged reactants}

8/144	. . {characterised by the electrolyte material}	8/2483	. . . characterised by internal manifolds
8/145	. . . {comprising carbonates}	8/2484	. . . characterised by external manifolds
8/146	. . {Fuel cells with molten hydroxide}	8/2485	. . . . Arrangements for sealing external manifolds; Arrangements for mounting external manifolds around a stack
2008/147	. . {Fuel cells with molten carbonates}	8/249	. . comprising two or more groupings of fuel cells, e.g. modular assemblies
8/148	. . {Measures, other than selecting a specific electrode material, to reduce electrode dissolution}	8/2495	. . . of fuel cells of different types
8/16	. Biochemical fuel cells, i.e. cells in which microorganisms function as catalysts	10/00	Secondary cells; Manufacture thereof
8/18	. Regenerative fuel cells, e.g. redox flow batteries or secondary fuel cells		NOTE
8/182	. . {Regeneration by thermal means}		In this group, secondary cells are accumulators receiving and supplying electrical energy by means of reversible electrochemical reactions.
8/184	. . {Regeneration by electrochemical means}	10/02	. Details (of electrodes H01M 4/00 ; of non-active parts H01M 50/00)
8/186	. . . {by electrolytic decomposition of the electrolytic solution or the formed water product}	10/04	. Construction or manufacture in general (H01M 10/058 , H01M 10/12 , H01M 10/28 , H01M 10/38 take precedence)
8/188	. . . {by recharging of redox couples containing fluids; Redox flow type batteries}	10/0404	. . {Machines for assembling batteries}
8/20	. Indirect fuel cells, e.g. fuel cells with redox couple being irreversible (H01M 8/18 takes precedence)	10/0409	. . . {for cells with wound electrodes}
8/22	. Fuel cells in which the fuel is based on materials comprising carbon or oxygen or hydrogen and other elements; Fuel cells in which the fuel is based on materials comprising only elements other than carbon, oxygen or hydrogen	10/0413	. . {Large-sized flat cells or batteries for motive or stationary systems with plate-like electrodes}
8/222	. . {Fuel cells in which the fuel is based on compounds containing nitrogen, e.g. hydrazine, ammonia}	10/0418	. . . {with bipolar electrodes}
8/225	. . {Fuel cells in which the fuel is based on materials comprising particulate active material in the form of a suspension, a dispersion, a fluidised bed or a paste}	10/0422	. . {Cells or battery with cylindrical casing}
8/227	. . {Dialytic cells or batteries; Reverse electrodialysis cells or batteries}	10/0427	. . . {Button cells}
8/24	. Grouping of fuel cells, e.g. stacking of fuel cells	10/0431	. . {Cells with wound or folded electrodes (H01M 10/045 takes precedence)}
8/2404	. . Processes or apparatus for grouping fuel cells	10/0436	. . {Small-sized flat cells or batteries for portable equipment}
8/241	. . with solid or matrix-supported electrolytes	10/044	. . . {with bipolar electrodes}
8/2418	. . . Grouping by arranging unit cells in a plane (H01M 8/2425 , H01M 8/244 take precedence)	10/0445	. . {Multimode batteries, e.g. containing auxiliary cells or electrodes switchable in parallel or series connections}
8/242	. . . comprising framed electrodes or intermediary frame-like gaskets (H01M 8/2425 , H01M 8/244 take precedence)	10/045	. . {Cells or batteries with folded plate-like electrodes}
8/2425	. . . High-temperature cells with solid electrolytes	10/0454	. . . {Cells or batteries with electrodes of only one polarity folded}
8/2428	. . . . Grouping by arranging unit cells on a surface of any form, e.g. planar or tubular	10/0459	. . {Cells or batteries with folded separator between plate-like electrodes}
8/243	. . . . Grouping of unit cells of tubular or cylindrical configuration	10/0463	. . {Cells or batteries with horizontal or inclined electrodes}
8/2432	. . . . Grouping of unit cells of planar configuration	10/0468	. . {Compression means for stacks of electrodes and separators}
8/2435	. . . . with monolithic core structure, e.g. honeycombs	10/0472	. . {Vertically superposed cells with vertically disposed plates}
8/244	. . . with matrix-supported molten electrolyte	10/0477	. . {with circular plates}
8/2455	. . with liquid, solid or electrolyte-charged reactants	10/0481	. . {Compression means other than compression means for stacks of electrodes and separators}
8/2457	. . with both reactants being gaseous or vaporised	10/0486	. . {Frames for plates or membranes}
8/2459	. . {Comprising electrode layers with interposed electrolyte compartment with possible electrolyte supply or circulation}	10/049	. . {Processes for forming or storing electrodes in the battery container}
8/2465	. . Details of groupings of fuel cells	2010/0495	. . {Nanobatteries}
8/247	. . . Arrangements for tightening a stack, for accommodation of a stack in a tank or for assembling different tanks	10/05	. Accumulators with non-aqueous electrolyte (H01M 10/39 takes precedence)
8/2475	. . . . Enclosures, casings or containers of fuel cell stacks	10/052	. . Li-accumulators
8/248	. . . . Means for compression of the fuel cell stacks	10/0525	. . . Rocking-chair batteries, i.e. batteries with lithium insertion or intercalation in both electrodes; Lithium-ion batteries
		10/054	. . Accumulators with insertion or intercalation of metals other than lithium, e.g. with magnesium or aluminium

- 10/056 . . characterised by the materials used as electrolytes, e.g. mixed inorganic/organic electrolytes
- 10/0561 . . . the electrolyte being constituted of inorganic materials only
- 10/0562 Solid materials
- 10/0563 Liquid materials, e.g. for Li-SOCl₂ cells
- 10/0564 . . . the electrolyte being constituted of organic materials only
- 10/0565 Polymeric materials, e.g. gel-type or solid-type
- 10/0566 Liquid materials
- 10/0567 characterised by the additives
- 10/0568 characterised by the solutes
- 10/0569 characterised by the solvents
- 10/058 . . Construction or manufacture
- 10/0583 . . . of accumulators with folded construction elements except wound ones, i.e. folded positive or negative electrodes or separators, e.g. with "Z"-shaped electrodes or separators
- 10/0585 . . . of accumulators having only flat construction elements, i.e. flat positive electrodes, flat negative electrodes and flat separators
- 10/0587 . . . of accumulators having only wound construction elements, i.e. wound positive electrodes, wound negative electrodes and wound separators
- 10/06 . Lead-acid accumulators ([semi-lead accumulators H01M 10/20](#))
- 10/08 . . Selection of materials as electrolytes
- 10/10 . . . Immobilising of electrolyte
- 10/12 . . Construction or manufacture
- 10/121 . . . {Valve regulated lead acid batteries [VRLA]}
- 10/122 . . . {Multimode batteries}
- 10/123 . . . {Cells or batteries with cylindrical casing}
- 10/124 {Button cells}
- 10/125 . . . {Cells or batteries with wound or folded electrodes}
- 10/126 . . . {Small-sized flat cells or batteries for portable equipment ([H01M 10/123](#) and [H01M 10/125](#) take precedence)}
- 10/127 {with bipolar electrodes}
- 10/128 . . . {Processes for forming or storing electrodes in the battery container}
- 10/14 . . . Assembling a group of electrodes or separators
- 10/16 . . . Suspending or supporting electrodes or groups of electrodes in the case
- 10/18 . . with bipolar electrodes
- 10/20 . Semi-lead accumulators, i.e. accumulators in which only one electrode contains lead
- 10/22 . . Selection of materials as electrolytes
- 10/24 . Alkaline accumulators
- 10/26 . . Selection of materials as electrolytes
- 10/28 . . Construction or manufacture
- 10/281 . . . {Large cells or batteries with stacks of plate-like electrodes}
- 10/282 {with bipolar electrodes}
- 10/283 . . . {Cells or batteries with two cup-shaped or cylindrical collectors ([H01M 10/281](#) takes precedence)}
- 10/285 {Button cells}
- 10/286 . . . {Cells or batteries with wound or folded electrodes}
- 10/287 . . . {Small-sized flat cells or batteries for portable equipment ([H01M 10/283](#) and [H01M 10/286](#) take precedence)}
- 10/288 . . . {Processes for forming or storing electrodes in the battery container}
- 10/30 . . Nickel accumulators ([H01M 10/34](#) takes precedence)
- 10/32 . . Silver accumulators ([H01M 10/34](#) takes precedence)
- 10/34 . Gastight accumulators
- 10/342 . . {Gastight lead accumulators ([H01M 10/121](#) takes precedence)}
- 10/345 . . {Gastight metal hydride accumulators}
- 10/347 . . . {with solid electrolyte}
- 10/36 . Accumulators not provided for in groups [H01M 10/05-H01M 10/34](#)
- 10/365 . . {Zinc-halogen accumulators}
- 10/38 . . Construction or manufacture
- 10/39 . . working at high temperature
- 10/3909 . . . {Sodium-sulfur cells}
- 10/3918 {characterised by the electrolyte}
- 10/3927 {Several layers of electrolyte or coatings containing electrolyte}
- 10/3936 {Electrolyte with a shape other than plane or cylindrical}
- 10/3945 {containing additives or special arrangements in the sodium compartment}
- 10/3954 {containing additives or special arrangement in the sulfur compartment}
- 10/3963 {Sealing means between the solid electrolyte and holders}
- 10/3972 {Flexible parts}
- 10/3981 {Flat cells}
- 10/399 . . . {Cells with molten salts}
- 10/42 . Methods or arrangements for servicing or maintenance of secondary cells or secondary half-cells ([H01M 10/60](#) takes precedence)
- 10/4207 . . {for several batteries or cells simultaneously or sequentially}
- 10/4214 . . {Arrangements for moving electrodes or electrolyte}
- 10/4221 . . {with battery type recognition}
- 10/4228 . . {Leak testing of cells or batteries}
- 10/4235 . . {Safety or regulating additives or arrangements in electrodes, separators or electrolyte ([H01M 10/4242](#) takes precedence)}
- 10/4242 . . {Regeneration of electrolyte or reactants}
- 10/425 . . {Structural combination with electronic components, e.g. electronic circuits integrated to the outside of the casing ([printed circuits H05K 1/00](#))}
- 10/4257 . . . {Smart batteries, e.g. electronic circuits inside the housing of the cells or batteries}
- 10/4264 . . . {with capacitors}
- 2010/4271 . . . {Battery management systems including electronic circuits, e.g. control of current or voltage to keep battery in healthy state, cell balancing}
- 2010/4278 . . . {Systems for data transfer from batteries, e.g. transfer of battery parameters to a controller, data transferred between battery controller and main controller}
- 10/4285 . . {Testing apparatus}

- 2010/4292 . . {Aspects relating to capacity ratio of electrodes/
electrolyte or anode/cathode}
- 10/44 . . Methods for charging or discharging (circuits for
charging H02J 7/00)
- 10/441 . . . {for several batteries or cells simultaneously or
sequentially}
- 10/443 . . . {in response to temperature}
- 10/445 . . . {in response to gas pressure}
- 10/446 . . . {Initial charging measures}
- 10/448 . . . {End of discharge regulating measures}
- 10/46 . . Accumulators structurally combined with
charging apparatus (circuits for charging
H02J 7/00)
- 10/465 . . . {with solar battery as charging system}
- 10/48 . . Accumulators combined with arrangements for
measuring, testing or indicating the condition of
cells, e.g. the level or density of the electrolyte
(constructional details of current conducting
connections for detecting conditions inside
cells or batteries, e.g. details of voltage sensing
terminals, H01M 50/569)

WARNING

Group [H01M 10/48](#) is impacted by
reclassification into group [H01M 50/569](#).

Groups [H01M 10/48](#) and [H01M 50/569](#) should
be considered in order to perform a complete
search.

- 10/482 . . . {for several batteries or cells simultaneously or
sequentially}

WARNING

Group [H01M 10/482](#) is impacted by
reclassification into group [H01M 50/569](#).

Groups [H01M 10/482](#) and [H01M 50/569](#)
should be considered in order to perform a
complete search.

- 10/484 . . . {for measuring electrolyte level, electrolyte
density or electrolyte conductivity}

WARNING

Group [H01M 10/484](#) is impacted by
reclassification into group [H01M 50/569](#).

Groups [H01M 10/484](#) and [H01M 50/569](#)
should be considered in order to perform a
complete search.

- 10/486 . . . {for measuring temperature}

WARNING

Group [H01M 10/486](#) is impacted by
reclassification into group [H01M 50/569](#).

Groups [H01M 10/486](#) and [H01M 50/569](#)
should be considered in order to perform a
complete search.

- 10/488 . . . {Cells or batteries combined with indicating
means for external visualization of the
condition, e.g. by change of colour or of light
density}
- WARNING**
- Group [H01M 10/488](#) is impacted by
reclassification into group [H01M 50/569](#).
- Groups [H01M 10/488](#) and [H01M 50/569](#)
should be considered in order to perform a
complete search.
- 10/52 . . Removing gases inside the secondary cell, e.g.
by absorption (vent plugs or other mechanical
arrangements for facilitating escape of gases
H01M 50/30)
 - 10/523 . . . {by recombination on a catalytic material}
 - 10/526 . . . {by gas recombination on the electrode surface
or by structuring the electrode surface to
improve gas recombination}
 - 10/54 . Reclaiming serviceable parts of waste accumulators
 - 10/60 . Heating or cooling; Temperature control
 - 10/61 . . Types of temperature control
 - 10/613 . . . Cooling or keeping cold
 - 10/615 . . . Heating or keeping warm
 - 10/617 . . . for achieving uniformity or desired distribution
of temperature
 - 10/62 . . specially adapted for specific applications
 - 10/623 . . . Portable devices, e.g. mobile telephones,
cameras or pacemakers
 - 10/6235 Power tools
 - 10/625 . . . Vehicles
 - 10/627 . . . Stationary installations, e.g. power plant
buffering or backup power supplies
 - 10/63 . . Control systems (charging or discharging
in response to temperature H01M 10/44 {,
H01M 10/443}; measurement of temperature
H01M 10/48 {, H01M 10/486})
 - 10/633 . . . characterised by algorithms, flow charts,
software details or the like
 - 10/635 . . . based on ambient temperature
 - 10/637 . . . characterised by the use of reversible
temperature-sensitive devices, e.g. NTC, PTC
or bimetal devices; characterised by control
of the internal current flowing through the
cells, e.g. by switching (means for preventing
undesired use or discharge H01M 50/572)
 - 10/64 . . characterised by the shape of the cells
 - 10/643 . . . Cylindrical cells
 - 10/647 . . . Prismatic or flat cells, e.g. pouch cells
 - 10/65 . . Means for temperature control structurally
associated with the cells
 - 10/651 . . . characterised by parameters specified by a
numeric value or mathematical formula, e.g.
ratios, sizes or concentrations
 - 10/652 characterised by gradients (for achieving a
desired temperature gradient H01M 10/617)
 - 10/653 . . . characterised by electrically insulating or
thermally conductive materials
 - 10/654 . . . located inside the innermost case of the cells,
e.g. mandrels, electrodes or electrolytes
 - 10/655 . . . Solid structures for heat exchange or heat
conduction

- 10/6551 Surfaces specially adapted for heat dissipation or radiation, e.g. fins or coatings
- 10/6552 Closed pipes transferring heat by thermal conductivity or phase transition, e.g. heat pipes
- 10/6553 Terminals or leads
- 10/6554 Rods or plates
- 10/6555 arranged between the cells
- 10/6556 Solid parts with flow channel passages or pipes for heat exchange ([closed pipes H01M 10/6552](#))
- 10/6557 arranged between the cells
- 10/656 . . . characterised by the type of heat-exchange fluid
- 10/6561 Gases
- 10/6562 with free flow by convection only
- 10/6563 with forced flow, e.g. by blowers
- 10/6564 using compressed gas
- 10/6565 with recirculation or U-turn in the flow path, i.e. back and forth
- 10/6566 Means within the gas flow to guide the flow around one or more cells, e.g. manifolds, baffles or other barriers ([H01M 10/6565 takes precedence](#))
- 10/6567 Liquids
- 10/6568 characterised by flow circuits, e.g. loops, located externally to the cells or cell casings
- 10/6569 Fluids undergoing a liquid-gas phase change or transition, e.g. evaporation or condensation ([heat pipes H01M 10/6552](#))
- 10/657 . . . by electric or electromagnetic means
- 10/6571 Resistive heaters ([arrangements for heating the battery by its resistance to the internal current H01M 10/637](#))
- 10/6572 Peltier elements or thermoelectric devices
- 10/658 . . . by thermal insulation or shielding
- 10/659 . . . by heat storage or buffering, e.g. heat capacity or liquid-solid phase changes or transition
- 10/6595 . . . by chemical reactions other than electrochemical reactions of the cells, e.g. catalytic heaters or burners
- 10/66 . . Heat-exchange relationships between the cells and other systems, e.g. central heating systems or fuel cells
- 10/663 . . . the system being an air-conditioner or an engine
- 10/667 . . . the system being an electronic component, e.g. a CPU, an inverter or a capacitor
- 12/00 Hybrid cells; Manufacture thereof (hybrid capacitors [H01G 11/00](#))**
- NOTES**
1. This group does not cover hybrid cells comprising capacitor electrodes and battery electrodes, which are covered by group [H01G 11/00](#).
 2. In this group, hybrid cells are 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.
- 12/02 . Details ([of electrodes H01M 4/00](#); [of non-active parts H01M 50/00](#))
- 12/04 . composed of a half-cell of the fuel-cell type and of a half-cell of the primary-cell type
- 12/06 . . with one metallic and one gaseous electrode
- 12/065 . . . {with [plate-like electrodes or stacks of plate-like electrodes](#)}
- 12/08 . composed of a half-cell of a fuel-cell type and a half-cell of the secondary-cell type
- 12/085 . . {[Zinc-halogen cells or batteries](#)}
- 14/00 Electrochemical current or voltage generators not provided for in groups [H01M 6/00](#) - [H01M 12/00](#); Manufacture thereof**
- NOTE**
- This group does not cover solar cells, photocells, photoelectrochemical cells or photovoltaic cells, which are covered by the following groups:
- semiconductor devices sensitive to light and adapted for the conversion of the energy of such radiation into electrical energy are covered by group [H01L 31/00](#);
 - solid-state devices using organic materials as active part specially adapted for sensing light and adapted for the conversion of the energy of such radiation into electrical energy are covered by group [H01L 51/42](#);
 - electrolytic light-sensitive devices, e.g. dye-sensitised solar cells, are covered by group [H01G 9/20](#);
 - photovoltaic modules structurally associated with energy storage means, e.g. batteries, are covered by group [H02S 40/38](#).
- 14/005 . {[Photoelectrochemical storage cells \(light sensitive devices \[H01G 9/20\]\(#\), semiconductors sensitive to light \[H01L 31/00\]\(#\)\)](#)}
- 16/00 Structural combinations of different types of electrochemical generators**
- 16/003 . {[of fuel cells with other electrochemical devices, e.g. capacitors, electrolyzers](#)}
- 16/006 . . {[of fuel cells with rechargeable batteries](#)}
- 50/00 Constructional details or processes of manufacture of the non-active parts of electrochemical cells other than fuel cells, e.g. hybrid cells**
- 50/10 . Primary casings, jackets or wrappings of a single cell or a single battery
- WARNING**
- Group [H01M 50/10](#) is impacted by reclassification into groups [H01M 50/102](#), [H01M 50/103](#), [H01M 50/105](#), [H01M 50/107](#), [H01M 50/109](#), [H01M 50/11](#), [H01M 50/14](#), [H01M 50/141](#), [H01M 50/143](#), and [H01M 50/145](#).
- All groups listed in this Warning should be considered in order to perform a complete search.

- 50/102 . . . characterised by their shape or physical structure

WARNING

Groups [H01M 50/102](#), [H01M 50/103](#), [H01M 50/105](#), [H01M 50/107](#), [H01M 50/109](#), and [H01M 50/11](#) are incomplete pending reclassification of documents from group [H01M 50/10](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/103 . . . prismatic or rectangular ([H01M 50/109](#), [H01M 50/11](#) take precedence)
- 50/105 . . . Pouches or flexible bags
- 50/107 . . . having curved cross-section, e.g. round or elliptic ([H01M 50/103](#), [H01M 50/109](#), [H01M 50/11](#) take precedence)
- 50/109 . . . of button or coin shape
- 50/11 . . . having a structure in the form of a chip
- 50/112 . . . Monobloc comprising multiple compartments

WARNING

Group [H01M 50/112](#) is impacted by reclassification into group [H01M 50/114](#).

Groups [H01M 50/112](#) and [H01M 50/114](#) should be considered in order to perform a complete search.

- 50/114 . . . specially adapted for lead-acid cells

WARNING

Group [H01M 50/114](#) is incomplete pending reclassification of documents from group [H01M 50/112](#).

Groups [H01M 50/112](#) and [H01M 50/114](#) should be considered in order to perform a complete search.

- 50/116 . . . characterised by the material

WARNING

Group [H01M 50/116](#) is impacted by reclassification into groups [H01M 50/117](#), [H01M 50/119](#), [H01M 50/121](#), [H01M 50/122](#), [H01M 50/124](#), [H01M 50/126](#), [H01M 50/128](#), [H01M 50/129](#), [H01M 50/131](#), [H01M 50/133](#), [H01M 50/134](#), [H01M 50/136](#), [H01M 50/14](#), [H01M 50/141](#), [H01M 50/143](#), and [H01M 50/145](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/117 . . . Inorganic material

WARNING

Groups [H01M 50/117](#) and [H01M 50/119](#) are incomplete pending reclassification of documents from group [H01M 50/116](#).

Groups [H01M 50/116](#), [H01M 50/117](#), and [H01M 50/119](#) should be considered in order to perform a complete search.

- 50/119 . . . Metals

- 50/121 . . . Organic material

WARNING

Group [H01M 50/121](#) is incomplete pending reclassification of documents from group [H01M 50/116](#).

Groups [H01M 50/116](#) and [H01M 50/121](#) should be considered in order to perform a complete search.

- 50/122 . . . Composite material consisting of a mixture of organic and inorganic materials

WARNING

Group [H01M 50/122](#) is incomplete pending reclassification of documents from group [H01M 50/116](#).

Groups [H01M 50/116](#) and [H01M 50/122](#) should be considered in order to perform a complete search.

- 50/124 . . . having a layered structure

WARNING

Groups [H01M 50/124](#), [H01M 50/126](#), [H01M 50/128](#), and [H01M 50/129](#) are incomplete pending reclassification of documents from group [H01M 50/116](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/1243 . . . {characterised by the internal coating on the casing}

- 50/1245 . . . {characterised by the external coating on the casing}

- 50/126 . . . comprising three or more layers

- 50/128 . . . with two or more layers of only inorganic material

- 50/129 . . . with two or more layers of only organic material

- 50/131 . . . characterised by physical properties, e.g. gas-permeability or size

WARNING

Groups [H01M 50/131](#) - [H01M 50/136](#) are incomplete pending reclassification of documents from group [H01M 50/116](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/133 . . . Thickness

- 50/134 . . . Hardness

- 50/136 . . . Flexibility or foldability

- 50/138 . . . adapted for specific cells, e.g. electrochemical cells operating at high temperature

- 50/1385 . . . {Hybrid cells}

- 50/14 . . . for protecting against damage caused by external factors

WARNING

Groups [H01M 50/14](#) - [H01M 50/145](#) are incomplete pending reclassification of documents from groups [H01M 50/10](#) and [H01M 50/116](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/141 . . . for protecting against humidity
 50/143 . . . Fireproof; Explosion-proof
 50/145 . . . for protecting against corrosion
 50/147 . . Lids or covers

WARNING

Group [H01M 50/147](#) is impacted by reclassification into groups [H01M 50/591](#) and [H01M 50/593](#).

Groups [H01M 50/147](#), [H01M 50/591](#), and [H01M 50/593](#) should be considered in order to perform a complete search.

- 50/148 . . . characterised by their shape

WARNING

Group [H01M 50/148](#) is impacted by reclassification into groups [H01M 50/15](#), [H01M 50/152](#), and [H01M 50/153](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/15 for prismatic or rectangular cells
 ([H01M 50/153](#) takes precedence)

WARNING

Group [H01M 50/15](#) is incomplete pending reclassification of documents from group [H01M 50/148](#).

Groups [H01M 50/148](#) and [H01M 50/15](#) should be considered in order to perform a complete search.

- 50/152 for cells having curved cross-section, e.g. round or elliptic ([H01M 50/15](#), [H01M 50/153](#) take precedence)

WARNING

Group [H01M 50/152](#) is incomplete pending reclassification of documents from group [H01M 50/148](#).

Groups [H01M 50/148](#) and [H01M 50/152](#) should be considered in order to perform a complete search.

- 50/153 for button or coin cells

WARNING

Group [H01M 50/153](#) is incomplete pending reclassification of documents from group [H01M 50/148](#).

Groups [H01M 50/148](#) and [H01M 50/153](#) should be considered in order to perform a complete search.

- 50/1535 {adapted for specific cells, e.g. electrochemical cells operating at high temperature}

- 50/1537 {for hybrid cells}

- 50/154 {Lid or cover comprising an axial bore for receiving a central current collector}

- 50/155 . . . characterised by the material

WARNING

Group [H01M 50/155](#) is impacted by reclassification into groups [H01M 50/157](#), [H01M 50/159](#), [H01M 50/16](#), [H01M 50/162](#), [H01M 50/164](#), [H01M 50/591](#), and [H01M 50/593](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/157 Inorganic material

WARNING

Groups [H01M 50/157](#) and [H01M 50/159](#) are incomplete pending reclassification of documents from group [H01M 50/155](#).

Groups [H01M 50/155](#), [H01M 50/157](#), and [H01M 50/159](#) should be considered in order to perform a complete search.

- 50/159 Metals

- 50/16 Organic material

WARNING

Group [H01M 50/16](#) is incomplete pending reclassification of documents from group [H01M 50/155](#).

Groups [H01M 50/155](#) and [H01M 50/16](#) should be considered in order to perform a complete search.

- 50/162 Composite material consisting of a mixture of organic and inorganic materials

WARNING

Group [H01M 50/162](#) is incomplete pending reclassification of documents from group [H01M 50/155](#).

Groups [H01M 50/155](#) and [H01M 50/162](#) should be considered in order to perform a complete search.

- 50/164 having a layered structure

WARNING

Group [H01M 50/164](#) is incomplete pending reclassification of documents from group [H01M 50/155](#).

Groups [H01M 50/155](#) and [H01M 50/164](#) should be considered in order to perform a complete search.

- 50/166 . . . characterised by the methods of assembling casings with lids

WARNING

Group [H01M 50/166](#) is impacted by reclassification into groups [H01M 50/167](#), [H01M 50/169](#), and [H01M 50/171](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/167 by crimping

WARNING

Group [H01M 50/167](#) is incomplete pending reclassification of documents from group [H01M 50/166](#).

Groups [H01M 50/166](#) and [H01M 50/167](#) should be considered in order to perform a complete search.

- 50/169 by welding, brazing or soldering

WARNING

Group [H01M 50/169](#) is incomplete pending reclassification of documents from group [H01M 50/166](#).

Groups [H01M 50/166](#) and [H01M 50/169](#) should be considered in order to perform a complete search.

- 50/171 using adhesives or sealing agents

WARNING

Group [H01M 50/171](#) is incomplete pending reclassification of documents from group [H01M 50/166](#).

Groups [H01M 50/166](#) and [H01M 50/171](#) should be considered in order to perform a complete search.

- 50/172 . . Arrangements of electric connectors penetrating the casing

WARNING

Group [H01M 50/172](#) is impacted by reclassification into groups [H01M 50/174](#), [H01M 50/176](#), [H01M 50/178](#), [H01M 50/179](#), and [H01M 50/181](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/174 . . . adapted for the shape of the cells

WARNING

Groups [H01M 50/174](#), [H01M 50/176](#), [H01M 50/178](#), [H01M 50/179](#), and [H01M 50/181](#) are incomplete pending reclassification of documents from group [H01M 50/172](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/176 for prismatic or rectangular cells ([H01M 50/181](#) takes precedence)

- 50/178 for pouch or flexible bag cells

- 50/179 for cells having curved cross-section, e.g. round or elliptic ([H01M 50/176](#), [H01M 50/181](#) take precedence)

- 50/181 for button or coin cells

- 50/182 {for cells with a collector centrally disposed in the active mass, e.g. Leclanché cells}

- 50/183 . . Sealing members

WARNING

Group [H01M 50/183](#) is impacted by reclassification into groups [H01M 50/184](#), [H01M 50/186](#), [H01M 50/188](#), [H01M 50/19](#), [H01M 50/191](#), [H01M 50/193](#), [H01M 50/195](#), [H01M 50/197](#), and [H01M 50/198](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/184 . . . characterised by their shape or structure

WARNING

Group [H01M 50/184](#) is incomplete pending reclassification of documents from group [H01M 50/183](#).

Groups [H01M 50/183](#) and [H01M 50/184](#) should be considered in order to perform a complete search.

- 50/186 . . . characterised by the disposition of the sealing members

WARNING

Groups [H01M 50/186](#) and [H01M 50/188](#) are incomplete pending reclassification of documents from group [H01M 50/183](#).

Groups [H01M 50/183](#), [H01M 50/186](#), and [H01M 50/188](#) should be considered in order to perform a complete search.

- 50/188 the sealing members being arranged between the lid and terminal

- 50/19 . . . characterised by the material

WARNING

Groups [H01M 50/19](#) - [H01M 50/198](#) are incomplete pending reclassification of documents from group [H01M 50/183](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/191 Inorganic material

- 50/193 Organic material
- 50/195 Composite material consisting of a mixture of organic and inorganic materials
- 50/197 having a layered structure
- 50/198 characterised by physical properties, e.g. adhesiveness or hardness
- 50/20 . Mountings; Secondary casings or frames; Racks, modules or packs; Suspension devices; Shock absorbers; Transport or carrying devices; Holders (structural combination of accumulators with charging apparatus [H01M 10/46](#))

WARNING

Group [H01M 50/20](#) is impacted by reclassification into groups [H01M 50/202](#), [H01M 50/204](#), [H01M 50/207](#), [H01M 50/209](#), [H01M 50/211](#), [H01M 50/213](#), [H01M 50/216](#), [H01M 50/218](#), [H01M 50/22](#), [H01M 50/222](#), [H01M 50/224](#), [H01M 50/227](#), [H01M 50/229](#), [H01M 50/231](#), [H01M 50/233](#), [H01M 50/236](#), [H01M 50/238](#), [H01M 50/24](#), [H01M 50/242](#), [H01M 50/244](#), [H01M 50/247](#), [H01M 50/249](#), [H01M 50/251](#), [H01M 50/253](#), [H01M 50/262](#), [H01M 50/264](#), [H01M 50/267](#), [H01M 50/269](#), [H01M 50/271](#), [H01M 50/273](#), [H01M 50/276](#), [H01M 50/278](#), [H01M 50/28](#), [H01M 50/282](#), [H01M 50/284](#), [H01M 50/287](#), [H01M 50/289](#), [H01M 50/291](#), [H01M 50/293](#), [H01M 50/296](#), [H01M 50/298](#), and [B60L 50/64](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/202 . . Casings or frames around the primary casing of a single cell or a single battery

WARNING

Group [H01M 50/202](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/202](#) should be considered in order to perform a complete search.

- 50/204 . . Racks, modules or packs for multiple batteries or multiple cells

WARNING

Group [H01M 50/204](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/204](#) should be considered in order to perform a complete search.

- 50/207 . . . characterised by their shape

WARNING

Group [H01M 50/207](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/207](#) should be considered in order to perform a complete search.

- 50/209 adapted for prismatic or rectangular cells ([H01M 50/216](#) takes precedence)

WARNING

Group [H01M 50/209](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Group [H01M 50/209](#) is also impacted by reclassification into group [H01M 50/211](#).

Groups [H01M 50/20](#), [H01M 50/209](#), and [H01M 50/211](#) should be considered in order to perform a complete search.

- 50/211 adapted for pouch cells

WARNING

Group [H01M 50/211](#) is incomplete pending reclassification of documents from groups [H01M 50/20](#) and [H01M 50/209](#).

Groups [H01M 50/20](#), [H01M 50/209](#), and [H01M 50/211](#) should be considered in order to perform a complete search.

- 50/213 adapted for cells having curved cross-section, e.g. round or elliptic ([H01M 50/209](#), [H01M 50/216](#) take precedence)

WARNING

Group [H01M 50/213](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/213](#) should be considered in order to perform a complete search.

- 50/216 adapted for button or coin cells

WARNING

Group [H01M 50/216](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/216](#) should be considered in order to perform a complete search.

- 50/218 . . characterised by the material

WARNING

Groups [H01M 50/218](#) - [H01M 50/231](#) are incomplete pending reclassification of documents from group [H01M 50/20](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/22 . . . of the casings or racks
- 50/222 Inorganic material
- 50/224 Metals
- 50/227 Organic material
- 50/229 Composite material consisting of a mixture of organic and inorganic materials
- 50/231 having a layered structure

- 50/233 . . characterised by physical properties of casings or racks, e.g. dimensions

WARNING

Groups [H01M 50/233](#) - [H01M 50/242](#) are incomplete pending reclassification of documents from group [H01M 50/20](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/236 . . . Hardness
 50/238 . . . Flexibility or foldability
 50/24 . . . adapted for protecting batteries from their environment, e.g. from corrosion ([thermal insulation H01M 10/658](#))
 50/242 . . . adapted for protecting batteries against vibrations, collision impact or swelling
 50/244 . . Secondary casings; Racks; Suspension devices; Carrying devices; Holders characterised by their mounting method

WARNING

Group [H01M 50/244](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/244](#) should be considered in order to perform a complete search.

- 50/247 . . specially adapted for portable devices, e.g. mobile phones, computers, hand tools or pacemakers

WARNING

Group [H01M 50/247](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/247](#) should be considered in order to perform a complete search.

- 50/249 . . specially adapted for aircraft or vehicles, e.g. cars or trains ([constructional details of batteries specially adapted for electric vehicles B60L 50/64](#))

WARNING

Group [H01M 50/249](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/249](#) should be considered in order to perform a complete search.

- 50/251 . . specially adapted for stationary devices, e.g. power plant buffering or backup power supplies

WARNING

Group [H01M 50/251](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/251](#) should be considered in order to perform a complete search.

- 50/253 . . adapted for specific cells, e.g. electrochemical cells operating at high temperature

WARNING

Group [H01M 50/253](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/253](#) should be considered in order to perform a complete search.

- 50/256 . . Carrying devices, e.g. belts
 50/258 . . Modular batteries; Casings provided with means for assembling
 50/26 . . . Assemblies sealed to each other in a non-detachable manner
 50/262 . . with fastening means, e.g. locks

WARNING

Groups [H01M 50/262](#) and [H01M 50/264](#) are incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#), [H01M 50/262](#), and [H01M 50/264](#) should be considered in order to perform a complete search.

- 50/264 . . . for cells or batteries, e.g. straps, tie rods or peripheral frames
 50/267 . . having means for adapting to batteries or cells of different types or different sizes

WARNING

Group [H01M 50/267](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/267](#) should be considered in order to perform a complete search.

- 50/269 . . Mechanical means for varying the arrangement of batteries or cells for different uses, e.g. for changing the number of batteries or for switching between series and parallel wiring ([methods or arrangements for servicing or maintenance H01M 6/50, H01M 10/42](#))

WARNING

Group [H01M 50/269](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/269](#) should be considered in order to perform a complete search.

- 50/271 . . Lids or covers for the racks or secondary casings

WARNING

Groups [H01M 50/271](#) - [H01M 50/282](#) are incomplete pending reclassification of documents from group [H01M 50/20](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/273 . . . characterised by the material
 50/276 Inorganic material
 50/278 Organic material

- 50/28 . . . Composite material consisting of a mixture of organic and inorganic materials
- 50/282 . . . having a layered structure
- 50/284 . . with incorporated circuit boards, e.g. printed circuit boards [PCB]

WARNING

Groups [H01M 50/284](#) and [H01M 50/287](#) are incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#), [H01M 50/284](#), and [H01M 50/287](#) should be considered in order to perform a complete search.

- 50/287 . . . Fixing of circuit boards to lids or covers
- 50/289 . . characterised by spacing elements or positioning means within frames, racks or packs ([spacing elements inside cells other than separators, membranes or diaphragms H01M 50/471](#))

WARNING

Groups [H01M 50/289](#) - [H01M 50/293](#) are incomplete pending reclassification of documents from group [H01M 50/20](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/291 . . . characterised by their shape
- 50/293 . . . characterised by the material
- 50/296 . . characterised by terminals of battery packs ([terminals of batteries H01M 50/543](#))

WARNING

Group [H01M 50/296](#) is incomplete pending reclassification of documents from groups [H01M 50/20](#) and [H01M 50/543](#).

Groups [H01M 50/20](#), [H01M 50/543](#), and [H01M 50/296](#) should be considered in order to perform a complete search.

- 50/298 . . characterised by the wiring of battery packs

WARNING

Group [H01M 50/298](#) is incomplete pending reclassification of documents from group [H01M 50/20](#).

Groups [H01M 50/20](#) and [H01M 50/298](#) should be considered in order to perform a complete search.

- 50/30 . Arrangements for facilitating escape of gases
- 50/308 . . Detachable arrangements, e.g. detachable vent plugs or plug systems
- 50/317 . . Re-sealable arrangements
- 50/325 . . . comprising deformable valve members, e.g. elastic or flexible valve members
- 50/333 Spring-loaded vent valves
- 50/342 . . Non-re-sealable arrangements
- 50/3425 . . . {[in the form of rupturable membranes or weakened parts, e.g. pierced with the aid of a sharp member](#)}

- 50/35 . . Gas exhaust passages comprising elongated, tortuous or labyrinth-shaped exhaust passages

WARNING

Group [H01M 50/35](#) is impacted by reclassification into groups [H01M 50/358](#) and [H01M 50/367](#).

Groups [H01M 50/35](#), [H01M 50/358](#), and [H01M 50/367](#) should be considered in order to perform a complete search.

- 50/358 . . . External gas exhaust passages located on the battery cover or case

WARNING

Group [H01M 50/358](#) is incomplete pending reclassification of documents from group [H01M 50/35](#).

Groups [H01M 50/35](#) and [H01M 50/358](#) should be considered in order to perform a complete search.

- 50/367 . . . Internal gas exhaust passages forming part of the battery cover or case; Double cover vent systems

WARNING

Group [H01M 50/367](#) is incomplete pending reclassification of documents from group [H01M 50/35](#).

Groups [H01M 50/35](#) and [H01M 50/367](#) should be considered in order to perform a complete search.

- 50/375 . . Vent means sensitive to or responsive to temperature
- 50/383 . . Flame arresting or ignition-preventing means
- 50/392 . . with means for neutralising or absorbing electrolyte; with means for preventing leakage of electrolyte through vent holes
- 50/394 . . {[Gas-pervious parts or elements](#)}
- 50/40 . Separators; Membranes; Diaphragms; Spacing elements inside cells

WARNING

Group [H01M 50/40](#) is impacted by reclassification into groups [H01M 50/471](#), [H01M 50/474](#), [H01M 50/477](#), [H01M 50/48](#), [H01M 50/483](#), [H01M 50/486](#), [H01M 50/489](#), [H01M 50/491](#), [H01M 50/494](#), and [H01M 50/497](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/403 . . Manufacturing processes of separators, membranes or diaphragms

WARNING

Group [H01M 50/403](#) is impacted by reclassification into group [H01M 50/406](#).

Groups [H01M 50/403](#) and [H01M 50/406](#) should be considered in order to perform a complete search.

50/406 . . . Moulding; Embossing; Cutting

WARNING

Group [H01M 50/406](#) is incomplete pending reclassification of documents from group [H01M 50/403](#).

Groups [H01M 50/403](#) and [H01M 50/406](#) should be considered in order to perform a complete search.

50/409 . . Separators, membranes or diaphragms characterised by the material

WARNING

Group [H01M 50/409](#) is impacted by reclassification into groups [H01M 50/443](#), [H01M 50/489](#), [H01M 50/491](#), [H01M 50/494](#), and [H01M 50/497](#).

All groups listed in this Warning should be considered in order to perform a complete search.

50/411 . . . Organic material

WARNING

Group [H01M 50/411](#) is impacted by reclassification into groups [H01M 50/414](#), [H01M 50/417](#), [H01M 50/42](#), [H01M 50/423](#), [H01M 50/426](#), [H01M 50/429](#), [H01M 50/489](#), [H01M 50/491](#), [H01M 50/494](#), and [H01M 50/497](#).

All groups listed in this Warning should be considered in order to perform a complete search.

50/414 Synthetic resins, e.g. thermoplastics or thermosetting resins

WARNING

Groups [H01M 50/414](#) - [H01M 50/426](#) are incomplete pending reclassification of documents from group [H01M 50/411](#).

All groups listed in this Warning should be considered in order to perform a complete search.

50/417 Polyolefins

50/42 Acrylic resins

50/423 Polyamide resins

50/426 Fluorocarbon polymers

50/429 Natural polymers

WARNING

Group [H01M 50/429](#) is incomplete pending reclassification of documents from group [H01M 50/411](#).

Groups [H01M 50/411](#) and [H01M 50/429](#) should be considered in order to perform a complete search.

50/4295 {Natural cotton, cellulose or wood}

50/431 . . . Inorganic material

WARNING

Group [H01M 50/431](#) is impacted by reclassification into groups [H01M 50/434](#), [H01M 50/437](#), [H01M 50/489](#), [H01M 50/491](#), [H01M 50/494](#), and [H01M 50/497](#).

All groups listed in this Warning should be considered in order to perform a complete search.

50/434 Ceramics

WARNING

Groups [H01M 50/434](#) and [H01M 50/437](#) are incomplete pending reclassification of documents from group [H01M 50/431](#).

Groups [H01M 50/431](#), [H01M 50/434](#), and [H01M 50/437](#) should be considered in order to perform a complete search.

50/437 Glass

50/44 . . . Fibrous material

50/443 . . . Particulate material

WARNING

Group [H01M 50/443](#) is incomplete pending reclassification of documents from group [H01M 50/409](#).

Groups [H01M 50/409](#) and [H01M 50/443](#) should be considered in order to perform a complete search.

50/446 . . . Composite material consisting of a mixture of organic and inorganic materials

50/449 . . . having a layered structure

WARNING

Group [H01M 50/449](#) is impacted by reclassification into groups [H01M 50/451](#), [H01M 50/454](#), [H01M 50/457](#), [H01M 50/489](#), [H01M 50/491](#), [H01M 50/494](#), and [H01M 50/497](#).

All groups listed in this Warning should be considered in order to perform a complete search.

50/451 comprising layers of only organic material and layers containing inorganic material

WARNING

Group [H01M 50/451](#) is incomplete pending reclassification of documents from group [H01M 50/449](#).

Groups [H01M 50/449](#) and [H01M 50/451](#) should be considered in order to perform a complete search.

- 50/454 . . . comprising a non-fibrous layer and a fibrous layer superimposed on one another

WARNING

Group [H01M 50/454](#) is incomplete pending reclassification of documents from group [H01M 50/449](#).

Groups [H01M 50/449](#) and [H01M 50/454](#) should be considered in order to perform a complete search.

- 50/457 . . . comprising three or more layers

WARNING

Group [H01M 50/457](#) is incomplete pending reclassification of documents from group [H01M 50/449](#).

Groups [H01M 50/449](#) and [H01M 50/457](#) should be considered in order to perform a complete search.

- 50/46 . . Separators, membranes or diaphragms characterised by their combination with electrodes

- 50/461 . . . {with adhesive layers between electrodes and separators}

- 50/463 . . Separators, membranes or diaphragms characterised by their shape

WARNING

Group [H01M 50/463](#) is impacted by reclassification into groups [H01M 50/466](#) and [H01M 50/469](#).

Groups [H01M 50/463](#), [H01M 50/466](#), and [H01M 50/469](#) should be considered in order to perform a complete search.

- 50/466 . . . U-shaped, bag-shaped or folded

WARNING

Group [H01M 50/466](#) is incomplete pending reclassification of documents from group [H01M 50/463](#).

Groups [H01M 50/463](#) and [H01M 50/466](#) should be considered in order to perform a complete search.

- 50/469 . . . tubular or cylindrical

WARNING

Group [H01M 50/469](#) is incomplete pending reclassification of documents from group [H01M 50/463](#).

Groups [H01M 50/463](#) and [H01M 50/469](#) should be considered in order to perform a complete search.

- 50/471 . . Spacing elements inside cells other than separators, membranes or diaphragms (for preventing incorrect contact inside or outside batteries [H01M 50/584](#)); Manufacturing processes thereof

WARNING

Groups [H01M 50/471](#) - [H01M 50/486](#) are incomplete pending reclassification of documents from group [H01M 50/40](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/474 . . . characterised by their position inside the cells
 50/477 . . . characterised by their shape
 50/48 . . . characterised by the material
 50/483 Inorganic material
 50/486 Organic material
 50/489 . . Separators, membranes, diaphragms or spacing elements inside the cells, characterised by their physical properties, e.g. swelling degree, hydrophilicity or shut down properties

WARNING

Groups [H01M 50/489](#) - [H01M 50/497](#) are incomplete pending reclassification of documents from groups [H01M 50/40](#), [H01M 50/409](#), [H01M 50/411](#), [H01M 50/431](#), and [H01M 50/449](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/491 . . . Porosity
 50/494 . . . Tensile strength
 50/497 . . . Ionic conductivity
 50/50 . . Current conducting connections for cells or batteries

WARNING

Group [H01M 50/50](#) is impacted by reclassification into group [H01M 50/569](#).

Groups [H01M 50/50](#) and [H01M 50/569](#) should be considered in order to perform a complete search.

- 50/502 . . Interconnectors for connecting terminals of adjacent batteries; Interconnectors for connecting cells outside a battery casing

WARNING

Group [H01M 50/502](#) is impacted by reclassification into groups [H01M 50/503](#), [H01M 50/505](#), [H01M 50/507](#), [H01M 50/509](#), [H01M 50/51](#), [H01M 50/512](#), [H01M 50/514](#), [H01M 50/516](#), [H01M 50/517](#), [H01M 50/519](#), [H01M 50/521](#), [H01M 50/522](#), [H01M 50/524](#), [H01M 50/526](#), and [H01M 50/569](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/503 . . . characterised by the shape of the interconnectors
- WARNING**
- Group [H01M 50/503](#) is incomplete pending reclassification of documents from group [H01M 50/502](#).
- Groups [H01M 50/502](#) and [H01M 50/503](#) should be considered in order to perform a complete search.
- 50/505 . . . comprising a single busbar
- WARNING**
- Group [H01M 50/505](#) is incomplete pending reclassification of documents from group [H01M 50/502](#).
- Groups [H01M 50/502](#) and [H01M 50/505](#) should be considered in order to perform a complete search.
- 50/507 . . . comprising an arrangement of two or more busbars within a container structure, e.g. busbar modules
- WARNING**
- Group [H01M 50/507](#) is incomplete pending reclassification of documents from group [H01M 50/502](#).
- Groups [H01M 50/502](#) and [H01M 50/507](#) should be considered in order to perform a complete search.
- 50/509 . . . characterised by the type of connection, e.g. mixed connections
- WARNING**
- Groups [H01M 50/509](#) - [H01M 50/512](#) are incomplete pending reclassification of documents from group [H01M 50/502](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 50/51 Connection only in series
- 50/512 Connection only in parallel
- 50/514 . . . Methods for interconnecting adjacent batteries or cells
- WARNING**
- Groups [H01M 50/514](#) - [H01M 50/517](#) are incomplete pending reclassification of documents from group [H01M 50/502](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 50/516 by welding, soldering or brazing
- 50/517 by fixing means, e.g. screws, rivets or bolts

- 50/519 . . . comprising printed circuit boards [PCB]
- WARNING**
- Group [H01M 50/519](#) is incomplete pending reclassification of documents from group [H01M 50/502](#).
- Groups [H01M 50/502](#) and [H01M 50/519](#) should be considered in order to perform a complete search.
- 50/521 . . . characterised by the material
- WARNING**
- Groups [H01M 50/521](#) - [H01M 50/526](#) are incomplete pending reclassification of documents from group [H01M 50/502](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 50/522 Inorganic material
- 50/524 Organic material
- 50/526 having a layered structure
- 50/528 . . . Fixed electrical connections, i.e. not intended for disconnection
- 50/529 . . . Intercell connections through partitions, e.g. in a battery casing
- 50/531 . . Electrode connections inside a battery casing
- WARNING**
- Group [H01M 50/531](#) is impacted by reclassification into groups [H01M 50/533](#), [H01M 50/534](#), and [H01M 50/536](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 50/533 . . . characterised by the shape of the leads or tabs
- WARNING**
- Group [H01M 50/533](#) is incomplete pending reclassification of documents from groups [H01M 50/531](#), [H01M 50/538](#), [H01M 50/54](#), and [H01M 50/541](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 50/534 . . . characterised by the material of the leads or tabs
- WARNING**
- Group [H01M 50/534](#) is incomplete pending reclassification of documents from groups [H01M 50/531](#), [H01M 50/538](#), [H01M 50/54](#), and [H01M 50/541](#).
- All groups listed in this Warning should be considered in order to perform a complete search.

- 50/536 . . . characterised by the method of fixing the leads to the electrodes, e.g. by welding

WARNING

Group [H01M 50/536](#) is incomplete pending reclassification of documents from groups [H01M 50/531](#), [H01M 50/538](#), [H01M 50/54](#), and [H01M 50/541](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/538 . . . Connection of several leads or tabs of wound or folded electrode stacks

WARNING

Group [H01M 50/538](#) is impacted by reclassification into groups [H01M 50/533](#), [H01M 50/534](#), and [H01M 50/536](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/54 . . . Connection of several leads or tabs of plate-like electrode stacks, e.g. electrode pole straps or bridges

WARNING

Group [H01M 50/54](#) is impacted by reclassification into groups [H01M 50/533](#), [H01M 50/534](#), and [H01M 50/536](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/541 for lead-acid accumulators

WARNING

Group [H01M 50/541](#) is impacted by reclassification into groups [H01M 50/533](#), [H01M 50/534](#), and [H01M 50/536](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/543 . . Terminals

WARNING

Group [H01M 50/543](#) is impacted by reclassification into groups [H01M 50/547](#), [H01M 50/548](#), [H01M 50/55](#), [H01M 50/552](#), [H01M 50/553](#), [H01M 50/559](#), [H01M 50/562](#), [H01M 50/564](#), [H01M 50/566](#), [H01M 50/567](#), [H01M 50/569](#), and [H01M 50/296](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/545 . . . formed by the casing of the cells (cup shaped terminals adapted for cells having curved cross-section [H01M 50/56](#))

- 50/547 . . . characterised by the disposition of the terminals on the cells

WARNING

Groups [H01M 50/547](#) - [H01M 50/55](#) are incomplete pending reclassification of documents from groups [H01M 50/543](#), [H01M 50/555](#), and [H01M 50/557](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/548 on opposite sides of the cell

- 50/55 on the same side of the cell

- 50/552 . . . characterised by their shape

WARNING

Groups [H01M 50/552](#), [H01M 50/553](#), and [H01M 50/559](#) are incomplete pending reclassification of documents from group [H01M 50/543](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/553 Terminals adapted for prismatic, pouch or rectangular cells

- 50/555 Window-shaped terminals

WARNING

Group [H01M 50/555](#) is impacted by reclassification into groups [H01M 50/547](#), [H01M 50/548](#), [H01M 50/55](#), [H01M 50/562](#), [H01M 50/564](#), [H01M 50/566](#), and [H01M 50/567](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/557 Plate-shaped terminals

WARNING

Group [H01M 50/557](#) is impacted by reclassification into groups [H01M 50/547](#), [H01M 50/548](#), [H01M 50/55](#), [H01M 50/562](#), [H01M 50/564](#), [H01M 50/566](#), and [H01M 50/567](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/559 Terminals adapted for cells having curved cross-section, e.g. round, elliptic or button cells ([H01M 50/553](#) takes precedence)

- 50/56 Cup shaped terminals

- 50/561 {Hollow metallic terminals, e.g. terminal bushings}

- 50/562 . . . characterised by the material

WARNING

Group [H01M 50/562](#) is incomplete pending reclassification of documents from groups [H01M 50/543](#), [H01M 50/555](#), and [H01M 50/557](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/564 . . . characterised by their manufacturing process

WARNING

Groups [H01M 50/564](#) - [H01M 50/567](#) are incomplete pending reclassification of documents from groups [H01M 50/543](#), [H01M 50/555](#), and [H01M 50/557](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/566 by welding, soldering or brazing
 50/567 by fixing means, e.g. screws, rivets or bolts
 50/569 . . Constructional details of current conducting connections for detecting conditions inside cells or batteries, e.g. details of voltage sensing terminals ([battery terminal connectors with integrated measuring arrangements G01R 31/364](#))

WARNING

Group [H01M 50/569](#) is incomplete pending reclassification of documents from groups [H01M 6/50](#), [H01M 6/5044](#), [H01M 6/505](#), [H01M 6/5055](#), [H01M 6/5061](#), [H01M 10/48](#), [H01M 10/482](#), [H01M 10/484](#), [H01M 10/486](#), [H01M 10/488](#), [H01M 50/50](#), [H01M 50/502](#), and [H01M 50/543](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/571 . . Methods or arrangements for affording protection against corrosion; Selection of materials therefor
 50/572 . . Means for preventing undesired use or discharge

WARNING

Group [H01M 50/572](#) is impacted by reclassification into groups [H01M 6/5044](#), [H01M 50/574](#), [H01M 50/583](#), [H01M 50/584](#), [H01M 50/586](#), [H01M 50/588](#), [H01M 50/59](#), [H01M 50/591](#), [H01M 50/593](#), [H01M 50/595](#), and [H01M 50/597](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/574 . . . Devices or arrangements for the interruption of current

WARNING

Groups [H01M 50/574](#) and [H01M 50/583](#) are incomplete pending reclassification of documents from group [H01M 50/572](#).

Groups [H01M 50/572](#), [H01M 50/574](#), and [H01M 50/583](#) should be considered in order to perform a complete search.

- 50/576 in response to theft
 50/578 in response to pressure
 50/579 in response to shock
 50/581 in response to temperature
 50/583 in response to current, e.g. fuses
 50/584 . . . for preventing incorrect connections inside or outside the batteries

WARNING

Groups [H01M 50/584](#), [H01M 50/586](#), [H01M 50/588](#), [H01M 50/59](#), [H01M 50/595](#), and [H01M 50/597](#) are incomplete pending reclassification of documents from group [H01M 50/572](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/586 inside the batteries, e.g. incorrect connections of electrodes
 50/588 outside the batteries, e.g. incorrect connections of terminals or busbars
 50/59 characterised by the protection means
 50/591 Covers

WARNING

Group [H01M 50/591](#) is incomplete pending reclassification of documents from groups [H01M 50/147](#), [H01M 50/155](#), and [H01M 50/572](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/593 Spacers; Insulating plates

WARNING

Group [H01M 50/593](#) is incomplete pending reclassification of documents from groups [H01M 50/147](#), [H01M 50/155](#), and [H01M 50/572](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/595 Tapes
 50/597 Protection against reversal of polarity
 50/598 Guarantee labels

- 50/60 . Arrangements or processes for filling or topping-up with liquids; Arrangements or processes for draining liquids from casings

WARNING

Group [H01M 50/60](#) is impacted by reclassification into groups [H01M 50/609](#), [H01M 50/618](#), [H01M 50/627](#), [H01M 50/673](#), and [H01M 50/682](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/609 . . Arrangements or processes for filling with liquid, e.g. electrolytes

WARNING

Groups [H01M 50/609](#), [H01M 50/618](#), and [H01M 50/627](#) are incomplete pending reclassification of documents from group [H01M 50/60](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/618 . . . Pressure control
50/627 . . . Filling ports
50/636 . . . Closing or sealing filling ports, e.g. using lids

WARNING

Group [H01M 50/636](#) is impacted by reclassification into groups [H01M 50/645](#), [H01M 50/655](#), [H01M 50/664](#), and [H01M 50/668](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 50/645 Plugs

WARNING

Groups [H01M 50/645](#) and [H01M 50/655](#) are incomplete pending reclassification of documents from group [H01M 50/636](#).

Groups [H01M 50/636](#), [H01M 50/645](#), and [H01M 50/655](#) should be considered in order to perform a complete search.

- 50/655 specially adapted for venting
50/664 Temporary seals, e.g. for storage of instant batteries or seawater batteries

WARNING

Group [H01M 50/664](#) is incomplete pending reclassification of documents from group [H01M 50/636](#).

Groups [H01M 50/636](#) and [H01M 50/664](#) should be considered in order to perform a complete search.

- 50/668 . . {Means for preventing spilling of liquid or electrolyte, e.g. when the battery is tilted or turned over}

WARNING

Group [H01M 50/668](#) is incomplete pending reclassification of documents from group [H01M 50/636](#).

Groups [H01M 50/636](#) and [H01M 50/668](#) should be considered in order to perform a complete search.

- 50/673 . . Containers for storing liquids; Delivery conduits therefor

WARNING

Groups [H01M 50/673](#) and [H01M 50/682](#) are incomplete pending reclassification of documents from group [H01M 50/60](#).

Groups [H01M 50/60](#), [H01M 50/673](#), and [H01M 50/682](#) should be considered in order to perform a complete search.

- 50/682 . . . accommodated in battery or cell casings
50/691 . . Arrangements or processes for draining liquids from casings; Cleaning battery or cell casings
50/70 . Arrangements for stirring or circulating the electrolyte
50/73 . . Electrolyte stirring by the action of gas on or in the electrolyte
50/77 . . with external circulating path

2200/00 Safety devices for primary or secondary batteries

- 2200/10 . Temperature sensitive devices
2200/101 . . Bimetal
2200/103 . . Fuse
2200/105 . . NTC
2200/106 . . PTC
2200/108 . . Normal resistors
2200/20 . Pressure-sensitive devices
2200/30 . Preventing polarity reversal

2220/00 Batteries for particular applications

- 2220/10 . Batteries in stationary systems, e.g. emergency power source in plant
2220/20 . Batteries in motive systems, e.g. vehicle, ship, plane
2220/30 . Batteries in portable systems, e.g. mobile phone, laptop

2250/00 Fuel cells for particular applications; Specific features of fuel cell system

- 2250/10 . Fuel cells in stationary systems, e.g. emergency power source in plant
2250/20 . Fuel cells in motive systems, e.g. vehicle, ship, plane
2250/30 . Fuel cells in portable systems, e.g. mobile phone, laptop
2250/40 . Combination of fuel cells with other energy production systems
2250/402 . . Combination of fuel cell with other electric generators ([combination of fuel cells with other electrochemical generator H01M 16/003](#))
2250/405 . . Cogeneration of heat or hot water
2250/407 . . Combination of fuel cells with mechanical energy generators

2300/00 Electrolytes

- 2300/0002 . Aqueous electrolytes
- 2300/0005 . . Acid electrolytes
- 2300/0008 . . . Phosphoric acid-based
- 2300/0011 . . . Sulfuric acid-based
- 2300/0014 . . Alkaline electrolytes
- 2300/0017 . Non-aqueous electrolytes
- 2300/002 . . Inorganic electrolyte
- 2300/0022 . . . Room temperature molten salts
- 2300/0025 . . Organic electrolyte
- 2300/0028 . . . characterised by the solvent
- 2300/0031 Chlorinated solvents
- 2300/0034 Fluorinated solvents
- 2300/0037 Mixture of solvents
- 2300/004 Three solvents
- 2300/0042 Four or more solvents
- 2300/0045 . . . Room temperature molten salts comprising at least one organic ion
- 2300/0048 . . Molten electrolytes used at high temperature
- 2300/0051 . . . Carbonates
- 2300/0054 . . . Halogenides
- 2300/0057 Chlorides
- 2300/006 . . . Hydroxides
- 2300/0062 . . . Nitrates
- 2300/0065 . . Solid electrolytes
- 2300/0068 . . . inorganic
- 2300/0071 Oxides
- 2300/0074 Ion conductive at high temperature
- 2300/0077 based on zirconium oxide
- 2300/008 Halides
- 2300/0082 . . . Organic polymers
- 2300/0085 . Immobilising or gelification of electrolyte
- 2300/0088 . Composites
- 2300/0091 . . in the form of mixtures
- 2300/0094 . . in the form of layered products, e.g. coatings
- 2300/0097 . . . with adhesive layers