28.30 - Sulphides; polysulphides, whether or not chemically defined.

2830.10 - Sodium sulphides

2830.90 - Other

Subject to the **exclusions** mentioned in the introduction of this sub-Chapter, this heading covers metal sulphides (salts of hydrogen sulphide (H_2S) of heading 28.11). The old name " sulphydrates " (hydrosulphides) is sometimes applied to the acid sulphides. Sulphides of non-metals are **excluded** (**heading 28.13**).

(1) **Sodium sulphides**.

(a) **Sodium sulphide** (Na_2S). Prepared by reducing sodium sulphate by means of coal. Either anhydrous, in whitish masses or plates (concentrated or melted sulphide), soluble in water, sulphating in the air, or in hydrated crystals (with 9 H_2O), colourless or greenish, according to their degree of purity. Mild reducing agent used in the preparation of organic compounds. In flotation processes, this sulphide promotes the absorption of oil on the surface of ores by sulphiding. Also used as a hair-remover (in tanning or in toilet preparations), and as a parasiticide.

(b) **Sodium hydrogen sulphide** (hydrosulphide) (NaHS). Obtained by the action of hydrogen sulphide on the neutral sulphide. Colourless crystals, soluble in water. Used as a de-hairing agent in tanning, in dyeing, as a copper absorbent in nickel refining, as a reducing agent in organic synthesis, etc.

(2) **Zinc sulphide** (ZnS). Artificial zinc sulphide is obtained in the hydrated form by precipitating an alkali zincate by means of sodium sulphide. White paste or powder often containing zinc oxide or other impurities. It is used, either pure or mixed with magnesia, as a pigment in the rubber industry. Co-precipitated with barium sulphate it forms lithopone (**heading 32.06**). Activated with silver, copper, etc., it gives a luminophore of **heading 32.06**. It should, however, be noted that zinc sulphide is classified in this heading **only when unmixed and non-activated**.

The heading **excludes** zinc blende (a natural zinc sulphide) (**heading 26.08**), and wurzite (also a natural zinc sulphide) (**heading 25.30**).

(3) **Cadmium sulphide** (CdS). The artificial sulphide is obtained by precipitation from a cadmium salt (e.g., sulphate) solution by hydrogen sulphide or an alkali sulphide. Yellow pigment (cadmium yellow) used by artists and in the manufacture of anti-glare glass; co-precipitated with barium sulphate, it forms the bright yellow colouring matter employed in paints or ceramics (**heading 32.06**).

The heading **excludes** natural cadmium sulphide (greenockite) (**heading 25.30**).

(4) **Ammonium hydrogen sulphide** (ammonium hydrosulphide) ($NH_4.HS$). Crystalline flakes or needles; very volatile. Used in photography and in organic synthesis.

(5) **Calcium sulphide** (CaS). Obtained by calcining a mixture of calcium sulphate and carbon. Greyish or yellowish masses, sometimes luminescent, almost insoluble in water. Often contains sulphate or other impurities. Used either alone, or treated with arsenous oxide or with lime for de-hairing hides. Used also as a hair-remover in toilet preparations, as a microbicide in medicine, in metallurgy and in the preparation of luminescent paints.

(6) **Iron sulphides**. The most important artificial iron sulphide is the ferrous sulphide (FeS) obtained by fusion of a mixture of sulphur and iron filings. Blackish plates, sticks or lumps, with a metallic glint. Used in the manufacture of hydrogen sulphide and in ceramics.

Natural iron sulphides are **excluded** - see **heading 25.02** (unroasted pyrites), or **71.03** or **71.05** (marcasite). Natural double sulphides of iron with arsenic (mispickel) or copper (bornite, chalcopyrite) fall in **headings 25.30** and **26.03**, respectively.

(7) **Strontium sulphide** (SrS). Greyish product, turning yellow on contact with air. Used as a hair-remover in the tanning industry, in cosmetic products and in the preparation of luminescent paints.

(8) **Tin sulphides**. Artificial stannic sulphide (tin disulphide) (SnS_2) is obtained by heating a mixture of sulphur and ammonium chloride with a tin oxide or amalgam. Golden yellow flakes or powder, insoluble in water and subliming when heated. Used for bronzing wood, plaster, etc.

(9) **Antimony sulphides**.

(a) **Artificial trisulphide** (Sb_2S_3). The action of an acid on the natural sulphide dissolved in sodium hydroxide gives a red or orange-coloured powder (precipitated trisulphide). Used either alone or mixed with pentasulphide or other products as a pigment in the rubber industry (antimony vermilion, antimony crimson). Melted natural sulphide gives black trisulphide, employed in pyrotechnics, in the manufacture of match head mixtures, of fulminating primers or caps (with potassium chlorate), of flashlight powder for photography (with potassium chromate), etc. Hot treatment with sodium carbonate gives " kermes mineral ", consisting essentially of antimony trisulphide and sodium pyro-antimonate and used in medicine (**heading 38.24**).

(b) **Pentasulphide** (golden antimony sulphide) (Sb_2S_5). Prepared by acidifying a solution of antimony sodium sulphide (Schlippe's salt). Orange-coloured powder, decomposing in course of time, even in the dark. Used for manufacturing primers, for vulcanising or colouring rubber, and in medicaments for human (expectorant) or veterinary uses.

Natural antimony sulphide (stibnite) and oxysulphide (kermesite) are **excluded** (**heading 26.17**).

(10) **Barium sulphide** (BaS). Obtained by reducing the natural sulphate (barytes, heading 25.11) by means of coal. White powder or lumps when pure, greyish or yellowish when impure. Toxic. Similar uses to strontium sulphide.

(11) **Other sulphides**. These include :

(a) **Potassium sulphides** (**neutral and acid**). Potassium hydrogen sulphide is used in the manufacture of mercaptans.

(b) **Copper sulphides**, used in the preparation of electrodes or of paints resisting the action of sea water; natural copper sulphide (covellite, chalcocite) is **excluded** (**heading 26.03**).

(c) **Lead sulphide**, used in ceramics; natural lead sulphide (galena) is **excluded** (**heading 26.07**).

Natural mercury sulphide (cinnabar, natural vermilion) and artificial mercury sulphides are **excluded** and fall in **headings 26.17** and**28.52**, respectively.

(12) **Polysulphides** which are also classified here, are mixtures of sulphides of the same metal.

(a) **Sodium polysulphide** is obtained by heating sulphur with sodium carbonate or neutral sodium sulphide. Contains mainly sodium disulphide (Na_2S_2), trisulphide and tetrasulphide and impurities (sulphate, sulphite, etc.). It occurs in greenish plates, soluble, oxidising in the air and very hygroscopic; it is kept in well-stoppered containers. Used mainly as a reducing agent in organic synthesis (preparation of sulphur dyes); in flotation processes; in the preparation of ethylene polysulphides, of artificial mercury sulphide, sulphur baths or mixtures for the treatment of scabies.

(b) **Potassium polysulphide** (" liver of sulphur ") is used for the same purposes as sodium polysulphide and more particularly for sulphur baths.

The heading also **excludes** the following natural sulphides :

(a) Nickel sulphide (millerite) (**heading 25.30**).

(b) Molybdenum sulphide (molybdenite) (**heading 26.13**).

(c) Vanadium sulphide (patronite) (**heading 26.15**).

(d) Bismuth sulphide (bismuthinite) (**heading 26.17**).