28.46 - Compounds, inorganic or organic, of rare-earth metals, of yttrium or of scandium or of mixtures of these metals.

2846.10 - Cerium compounds

2846.90 - Other

This heading covers the inorganic or organic compounds of yttrium, of scandium or of the rare-earth metals of heading 28.05 (lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium). The heading also covers compounds derived directly by chemical treatment from mixtures of the elements. This means that the heading will include mixtures of oxides or hydroxides of these elements or mixtures of salts having the same anion (e.g., rare-earth metal chlorides), but not mixtures of salts having different anions, whether or not the cation is the same. The heading will not therefore, for example, cover a mixture of europium and samarium nitrates with the oxalates nor a mixture of cerium chloride and cerium sulphate since these examples are not compounds derived directly from mixtures of elements, but are mixtures of compounds which could be conceived as having been made intentionally for special purposes and which, accordingly, fall in **heading 38.24**.

The heading also includes double or complex salts of these with other metals.

The compounds of this heading include :

(1) **Cerium compounds**.

(a) **Oxides and hydroxides**. Ceric oxide, a white powder insoluble in water, is obtained from cerium nitrate; it is used as an opacifier in ceramics, for colouring glass, in the preparation of arc-lamp carbons and as a catalyst in the manufacture of nitric acid and ammonia. There is also a ceric hydroxide. Cerous oxide and cerous hydroxide are not very stable.

(b) **Cerium salts**. Cerous nitrate ($Ce(NO_3)_3$) is used in the manufacture of gas-mantles. Ammonium ceric nitrate appears in the form of red crystals.

Cerium sulphates (cerous sulphate and its hydrates, hydrated ceric sulphate, orange-yellow prisms soluble in water) are used in photography as reducers. There are also double sulphates of cerium.

In addition to cerous chloride ($CeCl_3$) there are various other colourless cerous salts and yellow or orange ceric salts.

Cerium oxalate appears as a powder or in yellowish-white hydrated crystals, practically insoluble in water; it is used in the isolation of metals of the cerium group or in medicine.

(2) **Other rare-earth metal compounds**. Yttrium oxide (yttria), terbium oxide (terbia), mixtures of ytterbium oxides (ytterbia) and of oxides of other rare-earth metals of commerce are reasonably pure. The heading includes mixtures of salts derived directly from such mixtures of oxides.

The oxides of europium, samarium, etc. are used in nuclear reactors for the absorption of slow neutrons.

This heading **excludes** :

(a) Natural compounds of rare-earth metals, e.g., xenotime (complex phosphates), gadolinite or ytterbite and cerite (complex silicates) (**heading 25.30**) and monazite (phosphates of thorium and of rare-earth metals) (**heading 26.12**).

(b) Salts and other compounds, inorganic or organic, of promethium (**heading 28.44**).