rarely combined with arsenic or sulfur. It is indispensable in high-temperature laboratory work for electrodes, dishes, and electrical contacts that resist chemical attack even when very hot. Platinum is used in dental alloys and surgical pins; alloys typically containing 90 95% platinum are used in expensive jewelry. The international primary standard for the kilogram is made of 90% platinum, 10% iridium.

Platinum has valence 2 or 4 in its compounds, which include many coordination complexes. It and some compounds are useful catalysts, particularly for hydrogenation and in catalytic converters for reducing automobile emissions.

Platinum is found in nature alloyed with the other metals of the so-called platinum group, found in Group 10 of the periodic table; the other five metals in this group are iridium, osmium, palladium, rhodium, and ruthenium. These metals are found in alluvial deposits in Russia, South Africa, Colombia, and Alaska. Platinum and the related metals are recovered commercially as a byproduct of the refining of nickel ores mined near Sudbury, Ont., Canada; from gold mines in South Africa; and from the alluvial deposits in Russia. There is no routine method for separating platinum from other metals; it is usually recovered by complex chemical methods.

Platinum has many uses. Its wear- and tarnish-resistance characteristics are well-suited for making fine jewelry. Platinum and its alloys are used in surgical tools, laboratory utensils, electrical resistance wires, and electrical contact points. The most important of the alloys are those with iridium. The International Prototype Kilogram, kept at Sèvres, France, is a cylinder of platinum-iridium alloy, and the standard definition of a meter for a long time was based on the distance between two marks on a bar of platinum-iridium. Platinum is also used in the definition of the Standard Hydrogen Electrode (a reference for determining cell voltages).

Because its thermal coefficient of expansion is nearly equal to that of glass, platinum is used to make electrodes sealed in glass. It is used extensively in dentistry and a platinum-osmium alloy is used in implants such as pacemakers and replacement valves. A platinum-cobalt alloy is used to make very powerful magnets.

Platinum is specially prepared for use as a catalyst. Finely divided, the metal is platinum black, a powder. It also may be used as platinum sponge, formed when platinic ammonium chloride, (NH4)2PtCl6, is ignited, or as platinized asbestos, prepared by heating asbestos after dipping it in chloroplatinic acid. Platinum catalysts are used in the contact process for producing sulfuric acid, in the Ostwald process for the production of nitric acid, and in petroleum cracking, as well as in a variety of other reactions. Platinum is also used as a catalyst in fuel cells and in catalytic converters for automobiles.

Naturally-occurring platinum and platinum-rich alloys have been known since antiquity. Although there is evidence that the metal was used in the Americas in pre-Columbian times, the first European reference to platinum appears in 1557 as a description of a mysterious metal found in Central American mines. When the Spanish first encountered the metal, they regarded it as an undesirable impurity in the silver they were mining and often discarded it.

Occurrence

Originally a placer mineral in grains and nuggets in sands and gravels. Now mined from a mafic rock in South Africa and one of the sought-after metals in the Sudbury, Ontario, nickel complex, where tiny crystals of the arsenide sperrylite (PtAs 2) are found.

Once common as nuggets in placer deposits, sometimes associated with gold. Its primary occurrence is with other metal ores associated with basic igneous rocks; commonly in olivine-rich rocks known as dunites, olivine pyroxenites, or gabbros. The best crystals have come from the Urals, in