Neodymium Encyclopedia Article

Neodymium

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Contents

Neodymium Encyclopedia Article.....1

Contents.....2

Neodymium.....3

Neodymium

Neodymium is a rare earth element denoted by the atomic symbol Nd. It has an atomic number of 60 and an atomic weight of 144.24. It is a silver-white metal that has a melting point of 1860.8°F (1016°C) and boils at 5550.8°F (3066°C).

Early chemists were often confused about which materials were true elements and which were composites. Without today's periodic table of elements to refer to, the relationship between new elements was unclear, especially the metals that came to be called "rare earths." These rare earth elements (fifteen in number), which include neodymium, are actually not so rare--millions of pounds of them have since been found--but they were first extracted from scarce materials.

Before 1885, chemists believed that neodymium (pronounced neo-dim-ium) and a similar rare earth metal were a single element, which was then called didymium. But an Austrian chemist named Karl Auer (1858-1929) thought differently. His intense interest in the rare earths led him to isolate the metal oxides of two separate elements from didymium. He named these metal elements neodymium ("new twin") and praseodymium ("green twin," from the most prominent color in its light waves). A decade earlier, Swedish mineralogist Per Teodor Cleve (1840-1905) had suspected what Auer proved. Neodymium's atomic weight was later determined by Czech chemist Bohuslav Brauner (1855-1935).

At first, neodymium was used mainly to color glass, from rich violet to deep purple. Today, it is used to make sunglasses, art objects, protective goggles, and telescope lenses. In mixtures with other rare earths, neodymium helps catalyze the oil refining process, and it is an ingredient in cigarette lighter "flints." Neodymium is also an extremely strong magnet. When alloyed with iron and boron, it can be used to create a permanent magnet. Its unique properties have been exploited in lasers and electric capacitors, and its potential value in other electronic and optical applications continues to be explored. Neodymium is also being tested in a method to find the age of ancient volcanic rocks.