

Californium Encyclopedia Article

Californium

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Californium

Californium is a transuranium element designated by the atomic number 98 and atomic symbol Cf. Its atomic weight is estimated to be 251, and its melting point is approximately 1,652°F (900°C). It can be prepared by reducing the oxide, Cf₂O₃, with lanthanum.

The element was first produced by S. G. Thompson (1912-), K. Street, Jr., Albert Ghiorso, and Glenn T. Seaborg at the University of California. They created it by bombarding curium-242 with alpha particles in the university's cyclotron in 1950. No more than a few thousand atoms of the element were produced in the initial experiment. The discoverers of the element named it californium, after the state and university of California.

Unlike some other transuranium elements, californium has long-lived isotopes. This makes the preparation and study of the element more feasible. For example, californium-251 has a half life of about 800 years and californium-249, of about 360 years. Milligram quantities of the element's compounds are now being produced and sold.

Californium is the first element in which a new form of radioactive decay was observed. Some nuclei of the 252 isotope have been found to undergo nuclear fission spontaneously with a half life of 85.5 years.

The element's most interesting property may be the intense neutron emission produced by some of its isotopes. This property is being employed in neutron activation analysis used in the search for metals and metallic ions. It has also been used in the determination of water and oil-bearing layers by petroleum companies.

Researchers are also examining the use of californium in the treatment of certain types of cancer. Neutrons emitted by the element appear to be twice as effective in the destruction of tumor cells as are X-rays used in traditional radiation therapies.