FERMIUM

Element Symbol: Fm
Atomic Number: 100
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Fermium, a synthetic element, is the 100th element in the periodic table and a member of the actinide series. It is the heaviest element that can be formed by neutron bombardment of lighter elements, and hence the last element that can be prepared in macroscopic quantities. A total of 19 isotopes are known, with $^{257}\text{Fm}$ being the longest-lived one with a half-life of 100.5 days.

Fermium was first discovered in the debris from the ‘Ivy Mike’ nuclear test on the 1st November 1952, this was the first successful test of a hydrogen bomb. The discovery of fermium (Z = 100) required more material, as the yield was expected to be at least an order of magnitude lower than that of element 99, and so contaminated coral from the Eniwetok atoll, where the test had taken place, was shipped to the University of California Radiation Laboratory in Berkeley, California, for processing and analysis. This discovery, and the new data on neutron capture, was initially kept secret on the orders of the U.S. military until 1955 due to Cold War tensions. Nevertheless, the Berkeley team was able to prepare elements 99 and 100 by civilian means, through the neutron bombardment of plutonium-239, and published this work in 1954 with the disclaimer that it was not the first studies that had been carried out on the elements. The ‘Ivy Mike’ studies were declassified and published in 1955.

The Berkeley team had been worried that another group might discover lighter isotopes of element 100 through ion bombardment techniques before they could publish their classified research, and this proved to be the case. A group at the Nobel Institute for Physics in Stockholm independently discovered the element, producing an isotope later confirmed to be $^{250}\text{Fm}$ ($t_\text{½} = 30$ minutes) by bombarding a $^{238}\text{U}$ target with oxygen-16 ions, and published their work in May 1954. However, the Berkeley team were recognised, and with it the prerogative to name the new element in honour of the recently deceased Enrico Fermi, one of the pioneers of nuclear physics.

Fermium doesn’t occur naturally, and has not been found in the earth’s crust, so there is no reason to consider its environmental effects. Owing to the small amounts of produced fermium and its short half-life, there are currently no uses for it outside of basic scientific research. Like all synthetic elements, isotopes of fermium are extremely radioactive and are considered highly toxic.

Provided by the element sponsor Helen Allen

ARTISTS DESCRIPTION

Fermium was discovered in the fall-out debris from the first hydrogen bomb explosion in 1952, and my design was based on this. Since Fermium has a very short half-life and only minute quantities have been produced, its only use is in basic scientific research.

CATH DE LITTLE