

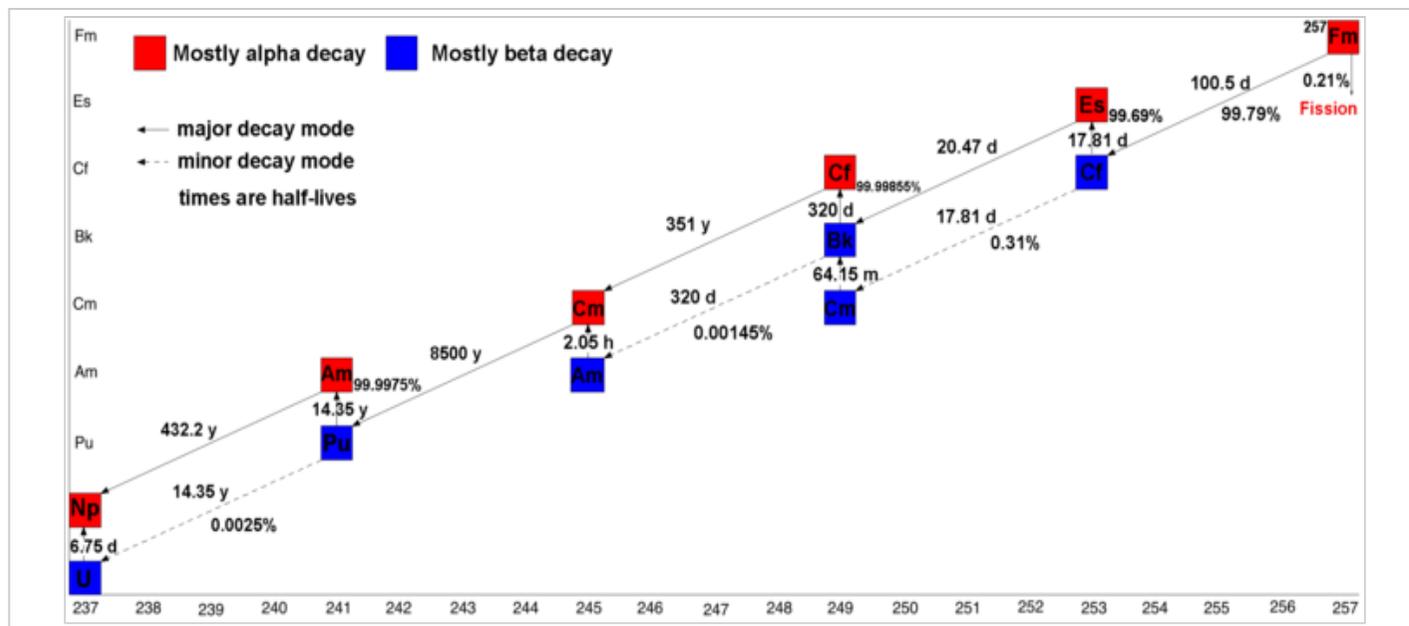
Fermium

From Wikipedia, the free encyclopedia

Fermium is a synthetic element with symbol **Fm** and atomic number 100. It is 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, although pure fermium metal has not yet been prepared.^[2] A total of 19 isotopes are known, with ²⁵⁷Fm being the longest-lived with a half-life of 100.5 days.

It was discovered in the debris of the first hydrogen bomb explosion in 1952, and named after Enrico Fermi, one of the pioneers of nuclear physics. Its chemistry is typical for the late actinides, with a preponderance of the +3 oxidation state but also an accessible +2 oxidation state. Owing to the small amounts of produced fermium and all of its isotopes having relatively short half-lives, there are currently no uses for it outside of basic scientific research.

Isotopes



Fermium, ¹⁰⁰Fm

General properties

Name, symbol fermium, Fm

Fermium in the periodic table

Atomic number (Z) 100

Group, block group n/a, f-block

Period period 7

Element category actinide

Standard atomic weight (A_r) (257)

Electron configuration [Rn] 5f¹² 7s²

per shell 2, 8, 18, 32, 30, 8, 2

Physical properties

Phase solid (*predicted*)

Melting point 1800 K (1527 °C, 2781 °F) (*predicted*)

Density near r.t. 9.7(1) g/cm³ (*predicted*)^[1]

Atomic properties

Oxidation states 2, 3

Electronegativity Pauling scale: 1.3

Ionization energies 1st: 627 kJ/mol (estimated)

There are 19 isotopes of fermium listed in NUBASE 2003,^[11] with atomic weights of 242 to 260,^[Note 1] of which ²⁵⁷Fm is the longest-lived with a half-life of 100.5 days. ²⁵³Fm has a half-life of 3 days, while ²⁵¹Fm of 5.3 h, ²⁵²Fm of 25.4 h, ²⁵⁴Fm of 3.2 h, ²⁵⁵Fm of 20.1 h, and ²⁵⁶Fm of 2.6 hours. All the remaining ones have half-lives ranging from 30 minutes to less than a millisecond.^[11] The neutron-capture product of fermium-257, ²⁵⁸Fm, undergoes spontaneous fission with a half-life of just 370(14) microseconds; ²⁵⁹Fm and ²⁶⁰Fm are also unstable with respect to spontaneous fission ($t_{1/2} = 1.5(3)$ s and 4 ms respectively).^[11] This means that neutron capture cannot be used to create nuclides with a mass number greater than 257, unless carried out in a nuclear explosion. As ²⁵⁷Fm is an α -emitter, decaying to ²⁵³Cf, and no fermium isotopes undergo beta minus decay (which would produce isotopes of the next element, mendelevium), fermium is also the last element that can be prepared by a neutron-capture process.^{[2][12][13]}

Source

- Wikipedia: Fermium (<https://en.wikipedia.org/wiki/Fermium>)

Miscellanea

Crystal structure face-centered cubic (fcc)



(predicted)^[1]

CAS Number 7440-72-4

History

Naming after Enrico Fermi
Discovery Lawrence Berkeley National Laboratory (1952)

Most stable isotopes of fermium

iso	NA	half-life	DM	DE (MeV)	DP
252Fm	syn	25.39 h	SF	-	-
			α	7.153	²⁴⁸ Cf
253Fm	syn	3 d	ϵ	0.333	²⁵³ Es
			α	7.197	²⁴⁹ Cf
255Fm	syn	20.07 h	SF	-	-
			α	7.241	²⁵¹ Cf
257Fm	syn	100.5 d	α	6.864	²⁵³ Cf
			SF	-	-