

Isotopes of Francium

Isotope	Atomic Mass	Half-life	Mode of Decay	Nuclear Spin
Fr-210	209.99640	3.20 minutes	α to At-206; EC to Rn-210	6
Fr-211	210.99553	3.10 minutes	α to At-207; EC to Rn-211	9/2
Fr-212	211.99618	20.00 minutes	α to At-208; EC to Rn-212	5
Fr-213	212.99617	34.60 seconds	α to At-209; EC to Rn-213	9/2
Fr-214	213.99895	0.0051 seconds	α to At-210	1
Fr-215	215.00033	0.0000012 seconds	α to At-211	9/2
Fr-216	216.00319	0.000007 seconds	α to At-212; EC to Rn-216	No data available
Fr-217	217.00462	0.00016 seconds	α to At-213	9/2
Fr-218	218.00756	0.001 seconds	α to At-214	1
Fr-219	219.00924	0.021 seconds	α to At-215	9/2
Fr-220	220.01231	27.40 seconds	α to At-216; β^- to Ra-220	1
Fr-221	221.01425	4.80 minutes	α to At-217; β^- to Ra-221; C-14	5/2
Fr-222	222.01754	14.30 minutes	β^- to Ra-222	2
Fr-223	223.019733	22.00 minutes	α to At-219; β^- to Ra-223	3/2
Fr-224	224.02323	3.00 minutes	β^- to Ra-224	1
Fr-225	225.02561	3.90 minutes	β^- to Ra-225	3/2
Fr-226	226.0293	49.00 seconds	β^- to Ra-226	1
Fr-227	227.0318	2.48 minutes	β^- to Ra-227	1/2

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Fr

Francium was discovered in 1939 by Marguerite Perey. It is named for France, where it was discovered. Its existence had been predicted during the 1870s by Mendeleev, who named it "eka-caesium," correctly predicting that its properties would resemble those of cesium.

Francium is the most unstable of the naturally-occurring elements. No weighable amount has ever been prepared. Preparing such a sample would be impossible, since the extreme heat of decay (the half-life of its longest-lived isotope is only 22 minutes) would immediately vaporize any viewable quantity of the element.

Due to its instability and rarity, there are no commercial applications for francium. It has been used for research purposes in the fields of biology and atomic structure. Its use as a potential diagnostic aid for various cancers has also been explored, but this application has been deemed impractical.

Properties of Francium

Name	Francium
Symbol	Fr
Atomic number	87
Atomic weight	223
Standard state	Solid at 298 °K
CAS Registry ID	7440-73-5
Group in periodic table	1
Group name	Alkali metal
Period in periodic table	7
Block in periodic table	s-block
Color	Metallic
Classification	Metallic
Melting point	30 °C
Boiling point	598 °C
Thermal conductivity	15 (estimate) W/(m·K)
Electronegativity	0.7
Heat of vaporization	About 65 kJ·mol ⁻¹
Heat of fusion	About 2 kJ·mol ⁻¹
Density of solid	2.90 (estimated) g/cm ³
Electron configuration	[Rn]7s ¹
Oxidation state	+1