Stable isotopes of lutetium available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
Lu-175	71	104	174.940768	97.41%	99.80%	Oxide
Lu-176	71	105	175.942683	2.59%	60.00-84.60%	Oxide

Lutetium was discovered in 1907 by Georges Urbain and Carl Auer von Welsbach. Its name originates with the Latin name *Lutetia,* the name of a Roman town on the site of modern-day Paris.

Lutetium is a silvery-white, lustrous metal with a hexagonal close-packed structure. It is soft, ductile and slightly paramagnetic. It reacts slowly with water and is soluble in dilute acids. In aqueous media, lutetium occurs as tripositive Lu^{3+} ion. Aqueous solutions of all its salts are colorless, while in dry form they are white crystalline solids. Lutetium's soluble salts — such as chloride, bromide, iodide, nitrate, sulfate and acetate — form hydrates upon crystallization. The oxide, hydroxide, fluoride, carbonate, phosphate and oxalate of the metal are insoluble in water. The metal dissolves in acids, forming the corresponding salts upon evaporation of the solution and crystallization.

There is very limited commercial application for lutetium. The metal emits beta particles after thermal neutron activation, and it is used to catalyze organic reactions as well as for dating meteorites. Stable lutetium can be used in petroleum cracking in refineries, as well as for alkylation, hydrogenation and polymerization applications. Its synthetic isotope Lutetium-177, when bound to octreotate, is used experimentally in targeted radionuclide therapy for neuroendocrine tumors.

Properties of Lutetium

Name	Lutetium
Symbol	Lu
Atomic number	71
Atomic weight	174.97
Standard state	Solid at 298 ºK
CAS Registry ID	7439-94-3
Group in periodic table	3
Group name	N/A
Period in periodic table	6
Block in periodic table	d-block
Color	Silvery white
Classification	Metallic

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Properties of Lutetium (continued)

Melting point	1663 °C
Boiling point	3395 °C
Vaporization point	3402 ºC
Thermal conductivity	16.4 W/(m·K) at 298.2 °K
Electrical resistivity	79.0 μΩ·cm at 25 °C
Electronegativity	1.2
Specific heat	0.155 J/g mol at 25 °C
Heat of vaporization	415 $kJ \cdot mol^{-1}$ at 3395 °C
Heat of fusion	22 $kJ \cdot mol^{-1}$
Density of liquid	9.3 g/cm^3 at 1663 °C
Density of solid	9.84 g/cm^3
Electron configuration	$[Xe]4f^{14}5d^{1}6s^{2}$
Atomic radius	1.7349 Å (coordination number 12)
Ionic radius	Lu^{3+}: 0.85 Å
Oxidation state	+3

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