

Topic Page: [Gadolinium](#)

Definition: **gadolinium** from *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*
Silvery-white metallic element of the lanthanide series, atomic number 64, relative atomic mass 157.25. It is found in the products of nuclear fission and used in electronic components, alloys, and products needing to withstand high temperatures.

Summary Article: **gadolinium**

From *The Columbia Encyclopedia*

(gădəlīn'ēəm), metallic chemical element; symbol Gd; at. no. 64; at. wt. 157.25; m.p. 1,312 degrees Celsius; b.p. 3,233 degrees Celsius; sp. gr. 7.898 at 25 degrees Celsius; valence +3. Gadolinium is a malleable, ductile, lustrous silver-white metal with a hexagonal close-packed crystalline structure at room temperature. It is a rare-earth metal found in Group 3 of the periodic table. Although the metal does not tarnish in dry air, in moist air an oxide film forms; the film flakes off, exposing more metal to oxidation. Gadolinium reacts slowly with water and dissolves in dilute mineral acids. It occurs in nature in its salts and especially as the oxide, gadolinia, a rare earth. It is a component of the minerals gadolinite, monazite, and bastnasite. Naturally occurring gadolinium is a mixture of seven isotopes; ten additional isotopes are known. Although gadolinium absorbs neutrons more effectively than does any other known substance, this property is caused by two isotopes that are present only to a limited extent in natural gadolinium. Gadolinium has found some use in control rods for nuclear reactors; it has also been used as a "poison" in nuclear fuels, added to control the initial rapid reaction and "burning out" as the reaction proceeds. Gadolinium metal can be prepared by reduction of anhydrous gadolinium fluoride with calcium metal. Gadolinium has unusual magnetic properties. At room temperature the metal is paramagnetic, but it becomes strongly ferromagnetic when cooled. Gadolinium compounds are used as phosphors in the manufacture of color-television picture tubes. Gadolinia, the oxide, was extracted from the mineral gadolinite [for J. Gadolin, a Finnish chemist] in 1880 by J. C. G. de Marignac; in 1886, P. E. Lecoq de Boisbaudran independently isolated the oxide from Mosander's "yttria."

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