



## Rare Earth Elements

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# RARE EARTH ELEMENTS

Rare Earth Elements are a family of 17 elements in the periodic table - 15 Lanthanide group elements, along with Yttrium and Scandium.

## + PROPERTIES

- Unique magnetic, luminescent, and electrochemical properties
- High - density, melting point, conductivity and thermal conductance
- Share a trivalent charge (+3)

## + TYPE - LIGHT AND HEAVY REES

Element	Symbol	Atomic Number	Element	Symbol	Atomic Number
<i>Light REES</i>			<i>Heavy REES</i>		
Lanthanum	La	57	Terbium	Tb	65
Cerium	Ce	58	Dysprosium	Dy	66
Praseodymium	Pr	59	Holmium	Ho	67
Neodymium	Nd	60	Erbium	Er	68
Samarium	Sm	62	Thulium	Tm	69
Europium	Eu	63	Ytterbium	Yb	70
Gadolinium	Gd	64	Lutetium	Lu	71
			Yttrium	Y	39

## + PRINCIPAL SOURCE

- Carbonatites:** Host world's largest REE deposits
- Alkaline Igneous Systems:** Comprise a group of uncommon igneous rock types (Deficient in silica, relative to sodium, potassium, and calcium)
- Ion-Absorption Clay Deposits:** Southern China (World's primary source of heavy REEs.)
- Monazite-Xenotime-Bearing Placer Deposits:** Principal source of rare earths and thorium in India

## + APPLICATIONS

- In lights, screens, and glass
- As catalysts
- In magnets, electronics and steel alloys
- In defence and energy sectors

## + ISSUES

- Sufficiently available but extraction/ utilisation unviable economically
- Heavy REEs not available in extractable quantities

## + INTERNATIONAL PRODUCTION

- China's monopoly (accounts for 60% of total)

World Reserves of Rare Earths (By Principal Countries)  
(In '000 tonnes of REO equivalent content)

Country	Reserves
World: Total (rounded off)	120000
Australia	3300
Brazil	22000
Myanmar	NA
Burundi	NA
Canada	830
China	44000
Greenland	1500
India	6900
Madagascar	NA
Russia	12000
South Africa	790
Tanzania	890
Thailand	NA
USA	1400
Vietnam	22000
Other countries	310