

# Rare-earth element

## What is It?

A rare-earth element (REE) or rare-earth metal (REM) is one of a set of 17 chemical elements in the periodic table. The 17 rare-earth elements are: cerium, dysprosium, erbium, europium, gadolinium, holmium, lanthanum, lutetium, neodymium, praseodymium, promethium, samarium, scandium, terbium, thulium, ytterbium and yttrium.

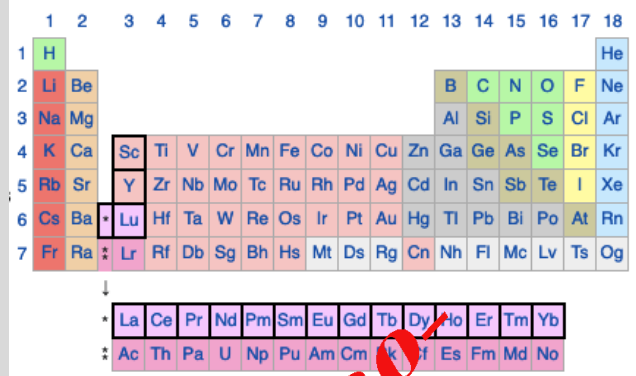
Despite their name, rare-earth are relatively plentiful in earth's crust.

Their electromagnetic properties come from their electronic configuration. It provides them radioactive properties.

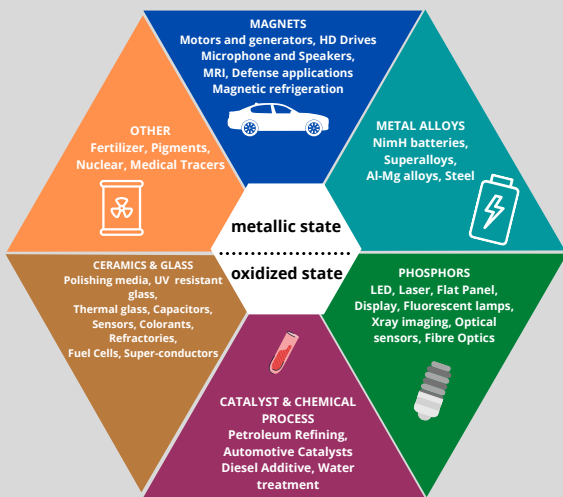
It wasn't until the Manhattan project that rare earths were used on an industrial level.

In the 1970s, yttrium found numerous applications in the manufacture of phosphors for cathode ray tube.

Today, they are part of strategic raw materials, because they are used in the largest number of consumer products in the world. Moreover, all rare-earths refineries are in China.



## Applications

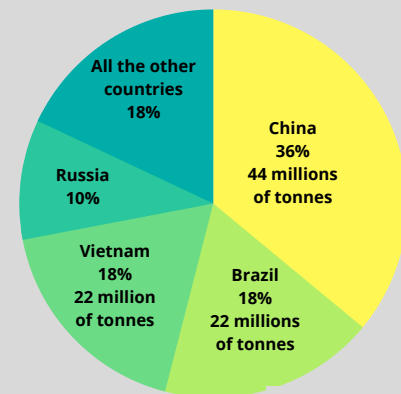


## Environmental consequences

Rare-earth industry is facing a challenge: respect for the environment. The extraction of those metals involve chemical process requiring a lot of water in toxic chemicals. Those processes even reject radioactive products.



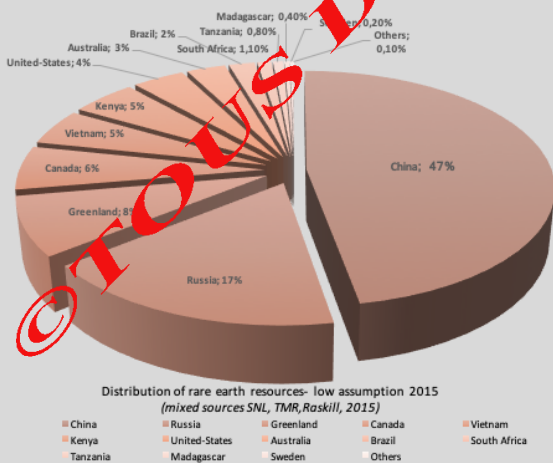
## Rare-earths at the heart of globalization



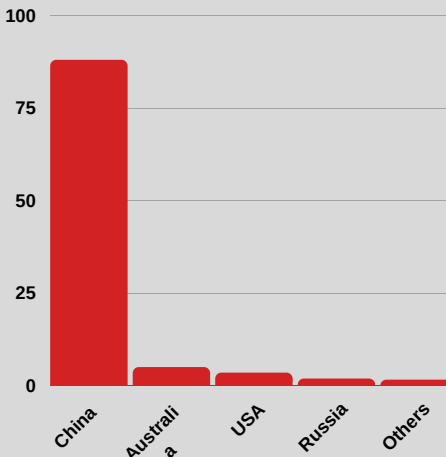
La Croix, 2019. « Les terres rares, au cœur de la mondialisation », 2 juin 2019. <https://www.la-croix.com/Economie/Monde/terres-rares-coeur-mondialisation-2019-06-02-1201026119>.

## Who owns and who produces

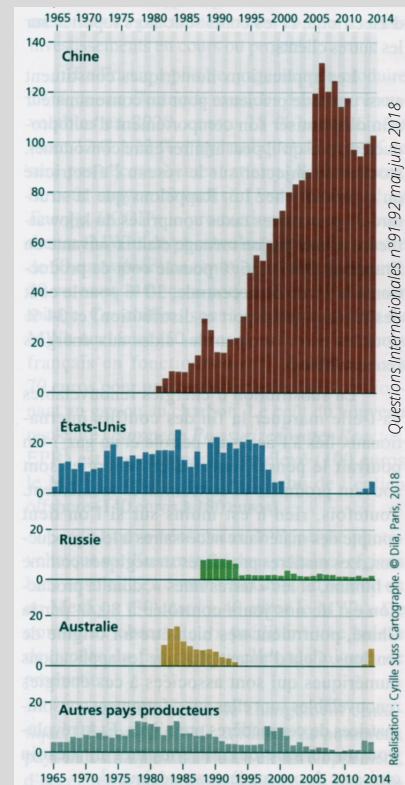
Distribution of rare earth resources low assumption 2015 (mixed sources SNL, TMR, Roskill, 2015)



Distribution of mineral production of rare earths in 2014 (Roskill, 2015)



Distribution of production, 1965-2014 (in thousand of tonnes)



<https://www.futura-sciences.com/planete/questions-reponses/geologie-terres-rares-reserves-mondiales-chine-afrique-7219>

"the Middle East has its oil, China has rare earths" Deng Xiao Ping 1992

Malcom Riddel - June 7, 2019 - China Debate

<https://www.chinadebate.com/nl/the-middle-east-has-its-oil-china-has-rare-earths-deng-xiaoping>