Rare earths, source of progress and conflicts

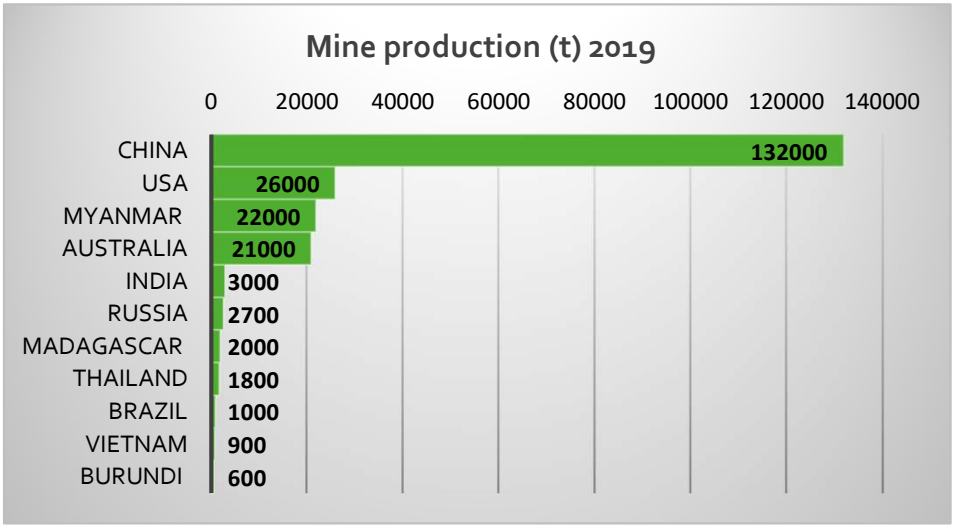
Part 1 - Overview and occurrence

The so-called rare earths (RE) are a set of different oxides whose metal component are at least one of the 17 elements* found mostly in the lanthanides group of the periodic table. They are chemically very similar and therefore only occur together in mines. Separating these elements is difficult and requires a lot of effort.
However, in contrast to the first impression, RE are not that scarce on the Earth´s surface as it may seem. In fact, some of them occur in a higher abundance than other more known metals like copper. What distinguishes them and gives their name rare earths is the fact that they typically appear in low concentrations.

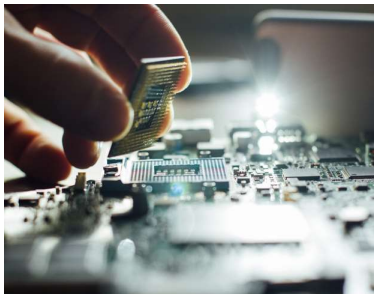
Ores of these metals are extremally rare to carry out an economical exploitation, which is cost-intensive and polluting.

The 11 countries which mined RE ores in 2019 are plotted in the graph below, where China is the biggest producer by far. [1]

In the following post we are going to discuss their applications and economical importance.



*Scandium (Sc), Yttrium (Y), Lanthanum (La), Cerium (Ce), Praseodymium (Pr), Neodymium (Nd), Samarium (Sm), Europium (Eu), Gadolinium (Gd), Terbium (Tb), Dysprosium (Dy), Holmium (Ho), Erbium (Er), Thulium (Tm), Ytterbium (Yb), Lutetium (Lu)



[1] U.S. Geological Survey, 2020, Mineral commodity summaries 2020: U.S. Geological Survey