

Rare earth metals

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In news- Recently, a bill was introduced in the US Senate that would force its defence contractors to stop buying rare earths metals from China by 2026 and use the Pentagon to create a permanent stockpile of the strategic minerals.

About Rare earth metals-

- The rare-earth elements (REE), also called the rare-earth metals or **rare-earth oxides, or the lanthanides** are a set of **17 nearly-indistinguishable lustrous silvery-white soft heavy metals**.
- Rare earths have diverse **applications** in electrical (electric vehicles) and electronic components, lasers, weaponry, glass, magnetic materials, and industrial processes.
- They do not occur as base metals or in lump or visible quantities like iron or aluminum, and hence their names and properties are unfamiliar in everyday life.



- The **first rare-earth mineral discovered (1787) was gadolinite**, a black mineral composed of cerium, yttrium, iron, silicon, and other elements.
- This mineral was **extracted from a mine in the village of Ytterby in Sweden**; four of the rare-earth elements bear names derived from this single location.
- **The content of the individual rare-earth elements varies**

considerably from mineral to mineral and from deposit to deposit.

- **REEs are categorized as being either “light” or “heavy”:**
- **Light REEs** (lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium and scandium) are produced in global abundance and are in surplus supply.
- **Heavy REEs** (terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and yttrium) are produced mainly in China and are in limited supply. Global efforts to bring new resources to the marketplace continue.
- They, when looked at anatomically, seem to be inseparable from each other, in that they are all almost exactly the same in terms of their chemical properties.
- However, in terms of their electronic properties, their magnetic properties, each one is really exquisitely unique.
- The **most abundant rare-earth element is cerium**, which is actually the 25th most abundant element in Earth’s crust, having 68 parts per million (about as common as copper).
- The exception is the highly unstable and radioactive promethium “rare earth” is quite scarce.
- The longest-lived isotope of promethium has a half-life of 17.7 years, so the element exists in nature in only negligible amounts (approximately 572 g in the entire Earth’s crust).
- Promethium is one of the two elements that do not have stable (non-radioactive) isotopes and are followed by (i.e. with higher atomic number) stable elements (the other being technetium).

Rare earth metals in India and the world-

- **China today controls nearly 90% of global rare earth production.** About 94 percent of the rare earths mined in

China are from bastnasite deposits

- The **United States has only one rare earths mine** and has no capability to process rare earth minerals. It stands second in terms of production. It is followed by Myanmar, Australia.
- **India has the world's fifth-largest reserves of rare earth elements**, but it imports most of its rare earth needs in finished form from China.

