India Explores Rare-Earth Deal with Myanmar

Source:IE

India is collaborating with the Kachin Independence Army (KIA) in Myanmar to secure rare-earth mineral samples, aiming to diversify its supply chain away from China.

- The KIA, founded in 1961, is one of Myanmar's most influential armed groups. They captured the Chipwe-Pangwa mining belt in Kachin state, which supplies most of the world's heavy rare earths, including dysprosium and terbium.

What are Rare Earth Minerals?

- **About:** Rare earths are a group of 17 elements including 15 silvery-white metals called lanthanides, or lanthanoids, plus scandium and yttrium.
    - In their **periodic table order,** they are: scandium, yttrium, lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium.
    - They are **not rare in the sense** that they are uncommon. They tend to be spread thin around the Earth's crust in small quantities and mixed together or with other minerals, so larger deposits are difficult to find and costly to extract.
- **Environmental Impact:**
    - Processing rare earths often involves the use of solvents, which can produce toxic waste that pollutes the soil, water, and atmosphere.
        - More environmentally friendly technologies are being developed, but they are not yet widely used.
    - Certain types of rare earth ores also contain radioactive thorium or uranium, which is often removed using acid.
        - For this reason, development of the sector faces health and environmental regulatory hurdles.
- **Use:** They are used in a wide range of products including consumer electronics, electric vehicles (EVs), aircraft engines, medical equipment, oil refining, and military applications such as missiles and radar systems.
- **Biggest Producer:** China accounts for about 60% of global mine production and 90% of processed and permanent magnet output.

Light rare earth elements	Heavy rare earth elements
Neodymium (Nd) and Praseodymium (Pr): Crucial for making powerful permanent magnets used in electric vehicles components, wind turbines, hard disk drives, and various automotive subsystems. Neodymium is also used in steelmaking to remove impurities and create specialized alloys	**Dysprosium (Dy) and Terbium (Tb):** Essential additives in neodymium magnets to enhance their performance at high temperatures, crucial for electric vehicle motors and wind turbine generators
Lanthanum (La): Used in nickel-metal hydride batteries, camera lenses including those in smartphones, as a catalyst in petroleum refining, as polishing agents for glass, in steelmaking to remove impurities	**Terbium (Tb) and Yttrium (Y):** Used to create the red, green, and blue phosphors in screens for smartphones, computers, televisions, and LED lighting
Cerium (Ce): Used in catalytic converters in automobiles to reduce emissions, glass polishing powders, and as an additive in some alloys	**Erbium (Er):** Used in fiber optics as an amplifier and in some medical lasers
Samarium (Sm): Used in certain types of magnets and in nuclear reactor control rods	
Europium (Eu): Used in red phosphors for screens and energy-efficient lighting.	
Gadolinium (Gd): Used as a contrast agent in MRI scans and in nuclear reactor control rods	
Scandium (Sc): Used in lightweight, high-strength alloys for aircraft components	
Praseodymium (Pr): Used in steelmaking to remove impurities and create specialized alloys	

What is the Status of India on Rare Earth Elements?

- India has the **world's fifth-largest rare earth reserves**, at 6.9 million metric tons, but there is no domestic magnet production. India **relies on imported magnets, mainly from China.**
- In the fiscal year to March 2025, India imported 53,748 metric tons of rare earth magnets. These are used in automobiles, wind turbines, medical devices and other manufactured goods.
- Rare earth mining is **restricted to IREL (**a miniratna company**),** which supplies India's Atomic Energy Department with materials for nuclear power projects and defence-related applications.
- IREL has a **rare earths extraction plant in Odisha and a refining unit in Kerala**.
- India is working to build its own processing capacity. IREL has been**seeking partnerships with Japanese and Korean companies** to manufacture rare earth magnets commercially.
    - IREL Limited has been mandated to produce REEs in the form of high pure rare earth oxides from rare earths bearing mineral Monazite in India.
- To reduce India's import dependency in REEs, the Atomic Minerals Directorate for Exploration and Research (AMD) is carrying out exploration to augment resources along the coastal, inland and riverine placer sands of the country.
- India has launched the **National Critical Mineral Mission (NCMM) in 2025.**
    - Under the NCMM, Geological Survey of India (GSI) has been assigned to carry out 1,200 exploration projects from FY25 to FY31.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims:

Q. With reference to the management of minor minerals in India, consider the following statements: **(2019)**

1. Sand is a 'minor mineral' according to the prevailing law in the country
2. State Governments have the power to grant mining leases of minor minerals, but the powers regarding the formation of rules related to the grant of minor minerals lie with the Central Government.
3. State Governments have the power to frame rules to prevent illegal mining of minor minerals.

Which of the statements given above is/are correct?

(a) 1 and 3 only

(b) 2 and 3 only

(c) 3 only

(d) 1, 2 and 3

Ans: (a)