

# AMPRI converts red mud into X-ray shielding tiles

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**In news**—Recently, CSIR- Advanced Materials and Processes Research Institute (AMPRI) has converted red mud into X-ray shielding tiles in a green and economically viable manner through a ceramic route by adding a certain weight percentage of high Z material and binder with it.

## **The X-ray shielding tiles-**

- The 12 mm thick tiles possess an attenuation equal to 2.1 mm lead at 100 kV.
- The developed tile has a flexural strength and a breaking strength.
- These tiles **can be used to build radiation shielding structures in diagnostic X-rays, CT scanner rooms, Cath labs, bone mineral density, dental X-rays, etc., instead of the toxic lead sheet to protect the public from radiation hazards.**
- **The developed tiles are tested and approved by the Atomic Energy Regulatory Board (AERB) of India.**
- **The product is commercialized and the first instalment has been initiated at INS Kattabomman, Tamilnadu.**

## **What is Red Mud?**

- **Red Mud is the waste generated in the Bayer process of alumina production from bauxite.**
- It is also **known as bauxite residue**. Red Mud is **defined as a “High Volume Low Effect Waste”**.
- The **clay-lined ponds often broke out and pollute soil, groundwater**, and air and become fatal for both humans and wildlife.
- It is **considered to be toxic due to its extreme**

**alkalinity and heavy element leaching.**

- **It is one of the underutilized industrial wastes** and getting accumulated over the years due to an increase in alumina production as well as inadequate technologies for its large-scale utilization.
- **The red mud contains 30 – 55% of Fe<sub>2</sub>O<sub>3</sub>(Iron(III) oxide or ferric oxide is the inorganic compound with the formula Fe<sub>2</sub>O<sub>3</sub>), which is suitable for attenuating high-energy ionizing radiations like X- and gamma rays.**
- The beneficial utilization of red mud is becoming a global issue.
- Noteworthy, **only 3-4% of red mud has been utilized by the industries to produce cement, bricks,** source of iron ore etc.
- Nearly 1 to 1.5 tonnes of RM is being generated while producing one tonne of alumina from the bauxite ore through the Bayer process.
- Annually about 175 million tonnes of red mud have been generated globally and stored in a specially designed clay-lined pond.
- Among that **India is producing nearly 9 million tonnes of red mud every year.**