Ceramics

Prelims: *Current events of national and international importance | Industry & Minerals*

Why in News?

As of early April 2026, many ceramic factories in Morbi, India's ceramic hub, have suspended operations for over 3 weeks due to severe gas supply shortages caused by the ongoing West Asia conflict.

- **Ceramic –** They are ***inorganic, non-metallic, solid materials.***
- **Raw materials –** Clay, silica, feldspar, kaolin, alumina.
- **Process –** Shaping to drying to firing at high temperatures.
- **Structure –** Primarily crystalline, glassy, or a mixture of both.
- **Properties –** Extremely hard and strong in compression, but brittle (prone to fracturing).
- **Durability –** Chemically non-reactive and heat-resistant.
- **Electrical –** Generally good insulators, although some can be conductive or superconducting.
- **Historical Significance –** Ceramics date back to ***Neolithic Age***, earliest pottery for storage and cooking.
- Used in ***Indus Valley Civilization*** for art, utility, and trade.
- Ancient civilizations (China, Mesopotamia, Egypt) perfected ceramic techniques for tiles, pottery, and ornaments.
- Symbol of cultural heritage and technological advancement.
- **Critical Minerals and Ceramics -** Ceramics rely on critical minerals like alumina, silica, zirconium, rare earths.
- Critical minerals policy directly impacts ceramic industry supply chains.
- Advanced ceramics essential for semiconductors, renewable energy, defense applications.
- India's push for critical mineral exploration aligns with strengthening ceramic technology for strategic sectors.
- **Morbi, The Ceramic Hub of India**
    - **Located in –** Saurashtra region of Gujarat

- **Accounts for - 90%** of India's ceramic tile production.
- **Crisis –** Dependent on propane-LPG imports from Persian Gulf; disrupted by Strait of Hormuz blockade.
- Exports to USA, Europe, Middle East.

India is world's 2nd largest ceramic tile producer.

- **Modern Applications of Ceramic**
  - **Construction –** Tiles, sanitaryware, flooring.
  - **Electronics –** Capacitors, insulators, superconductors.
  - **Medicine –** Bio-ceramics for dental implants, bone grafts.
  - **Defence –** Ceramic armour, heat-resistant coatings.
  - **Energy –** Ceramic membranes, fuel cells.
  - **Space –** Thermal protection systems in spacecraft.

Central Glass and Ceramic Research Institute (CGCRI)
• **Established in –** 1950, under CSIR (Council of Scientific & Industrial Research). • **Located in –** Kolkata. • **Mandate –** Research in glass, ceramics, refractories, and advanced materials. • **Contributions –** Optical fibers, bio-ceramics, structural ceramics, nuclear waste immobilization.

Reference

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