

## CORPORATE OFFICE

### Delhi Office

706 Ground Floor Dr. Mukherjee  
Nagar Near Batra Cinema Delhi -  
110009

### Noida Office

Basement C-32 Noida Sector-2  
Uttar Pradesh 201301

# CURRENT AFFAIRS

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## TANTALUM

*This article covers "Daily Current Affairs" and the topic details "Tantalum". This topic has relevance in the Science and Technology section of the UPSC CSE exam.*

*GS 3: Science and Technology*

### Why in the news?

In a groundbreaking revelation, a team of researchers from the Indian Institute of Technology (IIT), Ropar, has discovered the presence of tantalum, a rare metal, in the sands of the Sutlej River in Punjab. This discovery is poised to have far-reaching implications, particularly in the realms of electronics, semiconductors, and India's strategic mineral policy.

### Understanding Tantalum:

#### • Properties:

- Tantalum, with atomic number 73, is characterized by its grey color, heaviness, and exceptional corrosion resistance.
- Possessing high ductility, tantalum can be stretched into thin wires without breaking, and it boasts an extremely high melting point, surpassed only by tungsten and rhenium.

#### • Discovery:

- Discovered by Swedish chemist Anders Gustaf Ekenberg in 1802, tantalum was found in minerals obtained from Ytterby, Sweden.

### Uses of Tantalum:

#### • Electronic Sector:

- Tantalum plays a pivotal role in the electronics sector, particularly in the manufacture of capacitors.
- Capacitors made from tantalum are known for their ability to store more electricity in smaller sizes, making them ideal for devices like smartphones, laptops, and digital cameras.

#### • Substitute for Platinum:

- Its high melting point positions tantalum as a cost-effective substitute for platinum in various applications.

#### • Medical Applications:

- Tantalum, due to its non-reactivity with bodily fluids, is employed in the production of surgical equipment and implants, including artificial joints.

- **Industrial Uses:**

- Tantalum carbide (TaC) in combination with graphite forms one of the hardest known materials, utilized on the cutting edges of high-speed machine tools.
- Widely used in components for chemical plants, nuclear power plants, aerospace, and missile systems.



**Significance of Tantalum Discovery in Sutlej River:**

- **Semiconductor Manufacturing:**
  - The discovery holds particular significance for India's semiconductor industry, aligning with recent governmental efforts to boost domestic manufacturing.
- **Critical Mineral Policy:**
  - Tantalum is listed in India's critical mineral policy, which addresses the country's dependence on imports for 10 crucial minerals.
  - This policy strategically maps mineral requirements for sectors such as renewables, defense, electronics, telecommunications, and transportation.
- **Reducing Dependence on China:**
  - The discovery of tantalum in the Sutlej River is a step towards reducing India's reliance on China for critical minerals.
- **Renewable Energy Goals:**

- Supports India's ambitious renewable energy targets, aiming for a 500 GW share in the grid and a significant transition to electric vehicles by 2030.
- **Economic Impact on State:**
- The tantalum discovery has the potential to positively impact the state's economy by promoting the mining of these valuable metals.

Source:  
<https://indianexpress.com/article/explained/explained-sci-tech/tantalum-metal-sutlej-use-9036349/>

**Q.1 Regarding Tantalum, consider the following statements:**

1. Tantalum has atomic number 73.
2. It is highly corrosion-resistant.
3. Tantalum is crucial in the electronics sector, especially for capacitors known for efficient electricity storage.

**How many of the above statement/s is/are correct?**

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

**ANSWER: C**

**Q.2 Examine the importance of critical minerals for India's strategic sectors. Discuss the challenges posed by their import dependency.**

**Rishabh**

