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India's First Silicon Carbide Facility

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Why in the News?

India's first silicon carbide manufacturing plant is set to be **established in Odisha** with an investment of **Rs 620 crore**.

- The facility, developed by **RIR Power Electronics Limited**, a key player in semiconductor power electronics, **will be located at EMC Park in Infovalley**, Bhubaneswar.

Silicon Carbide (SiC)

- It is a **compound made of silicon and carbon**.
- It has **excellent heat conductivity**, which makes it ideal **for high-temperature applications**.
- It is **chemically inert** and **resistant to corrosion by acids, alkalis and salts**.
- It has a **very high melting point**, around **2,730°C (4,950°F)**.

Acheson process: It is produced by this process where **silica (SiO₂)** and **carbon (usually in the form of petroleum coke)** are heated to high temperatures in an electric furnace.

- This process **forms SiC crystals** and **releases carbon dioxide** as a by-product.

Uses

- **High-temperature semiconductor devices** like **diodes, MOSFETs** (metal-oxide-semiconductor field-effect transistors).
- **Abrasive materials** such as **grinding wheels, sandpapers, cutting tools, and bulletproof vests**.
- **Electric vehicles (EVs) and hybrid vehicles** for **power conversion, improving energy efficiency and reducing heat generation**.
- **Solar power inverters, LEDs** and **Aerospace components**.