

### 3. Laser Carbon

#### Why in News?

- Researchers have recently developed a novel Carbon-Based Catalyst called Laser Carbon to make water electrolysis more efficient

#### Highlights

- Laser Carbon can replace expensive metal-based catalysts in the electrolysis of water to produce hydrogen.
- The electrolysis of water consumes a lot of energy. The traditional solution is to use a catalyst to induce the water molecules to split at a lower energy.
- Laser carbon is a porous carbon material containing nitrogen that acts as both a catalyst and an anode in electrolysis.
- It reduces the energy required for splitting water by lowering the overpotential of the Oxygen Evolution Reaction (OER).
- Laser carbon is simpler to synthesise, and can be batch-manufactured with a laser in an environmentally friendly process, unlike other carbon-based catalysts.
- Common catalysts are based on iridium and ruthenium, which are expensive and in great demand in other sectors.
- Although its catalytic activity is not as good as metal-based catalysts, it can be improved by using different polymers in the fabrication process.
- Electrolysis is a process of using an electric current to bring about a chemical reaction.
- In electrolysis, an electric current is passed through an electrolyte (a substance that conducts electricity when dissolved in water or melted) to produce a chemical change.
- The electric current causes the positive and negative ions in the electrolyte to move towards the opposite electrodes, causing the separation of the electrolyte into its constituent elements or the formation of a new compound.
- Electrolysis is used in a variety of industrial processes, including the production of metals, cleaning metal surfaces, and the production of hydrogen gas from water