

Iron Ion Battery

April 19, 2020

Why in news?

IIT Madras has invented the world's first rechargeable iron ion battery.

What is this battery?

- The newly-developed battery by IIT-Madras is made using an anode made from low-carbon steel, along with a cathode made of vanadium pentoxide.
- Vanadium pentoxide has been selected since it has a layered composition with very wide interlayer spacing which allows iron ions to easily move in and bind to cathode interlayers, as well as easily separate themselves and move back to the anode.
- The electrolyte used is iron chlorate.

Advantages over lithium-ion batteries:

- The iron-ion battery is much more cost-effective and features slightly better storage capacity and stability compared to the traditional lithium-ion batteries.
- They are safer to use due to the inability of iron to produce dendrites during the charging process and therefore, prevents short-circuiting of the batteries.
- The other notable benefit is its favourable physical and chemical properties.
- It has good power retention after multiple charge cycles (It is capable of 150 cycles of charging and discharging for the time being).

Drawback:

At the present stage, the energy density of the battery is able to reach around 220 Wh/kilo, which is only around 55-60 per cent of the 350 Wh/kilo of energy density for lithium-ion

battery.