

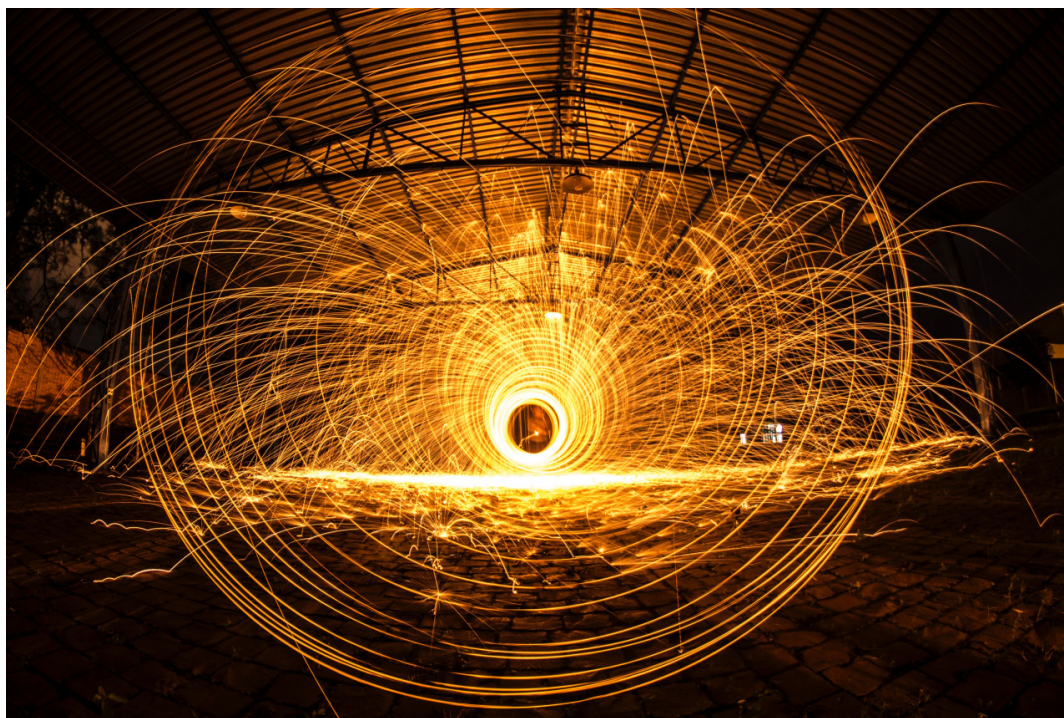
New CO₂ to carbon monoxide (CO) conversion technology

By IASToppers | 2023-11-08 15:25:00



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A new “**CO₂ to carbon monoxide (CO) conversion technology**” has been developed by National Centre of Excellence in Carbon Capture and Utilisation (**NCoE-CCU**), supported by the **DST** (Department of Science & Technology).



[ref-ET news]

About the CO₂ to carbon monoxide (CO) conversion technology:

- It captures **CO₂** from **various emission** sources, and converts it into **usable chemicals** or **permanent storage**.
- It converts **carbon dioxide** to **carbon monoxide** using **electro catalytic** conditions and under **ambient temperatures** and presence of **water**.
- It has received **patent**, a type of **intellectual property** that gives its **owner** the legal right to exclude others from making, using, or selling an invention for a limited period.
- The energy required for this **electrocatalysis** reaction can be harnessed from a renewable energy source, ensuing a carbon-neutral operating scenario for a facile CO₂ to CO conversion.

Significance of the new technology:

- It will help support India's Nationally determined contributions (**NDCs**) for zero net emissions by **2070**.
- If this **emitted CO₂** can be **captured** and **converted** into CO, it can lead to a **circular economy** in this process, while reducing the **carbon footprint** and associated costs.
 - The **circular economy** is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as much as possible.
- Before this technology, CO was generated by **partial oxidation** of coke or coal, which leads to production of **CO₂** as an **end product** of this process, leading to **greenhouse gas** effect.

About the Carbon monoxide (CO):

- The Carbon monoxide is a **poisonous, flammable gas** that is colorless, odorless, tasteless, and

slightly less dense than air.

- Its most common source is the **partial combustion** of carbon-containing compounds.
- It easily combines with **haemoglobin** to produce **carboxyhaemoglobin** which potentially reduces oxygen in the body and hence its **exposure** can be **highly toxic**.

Uses of Carbon monoxide (CO):

- The Carbon monoxide (CO) is a widely used **chemical** in the **industry** especially in the form of **syn gas**.
- In the steel industry, it is an essential ingredient for **converting iron ores to metallic iron in blast furnaces**.
- It is a strong **reductive agent** and has been used in **pyrometallurgy** to reduce metals from ores since ancient times and hence extract pure metal from ore.
- It has also been used as a **lasing medium** in **high-powered** infrared lasers.
- It has been used as a **fuel** on **Mars**, due to abundance of **carbon dioxide** on mars' atmosphere, which was then converted in to the carbon monoxide.
- It is used in **packaging systems** of **fresh meat products** in order to keep them **fresh**.