High-Entropy Alloy for Hydrogen Production

Source: BL

Researchers have developed a **high-entropy alloy (HEA) catalyst** for **water electrolysis, enhancing hydrogen production** while **reducing dependence on costly materials like platinum** for clean energy generation.

- **Alloys & High-Entropy Alloys (HEAs): Alloys** are metallic substances composed of **2 or more elements,** while **HEAs** are advanced **metallic alloys** materials with **5 or more elements** mixed in **equal or similar proportions**.
    - **HEA catalyst** consists of **platinum, palladium, cobalt, nickel, and manganese.**
- HEAs possess **high strength, corrosion, and wear resistance**, ensuring durability.

HEA Role in Electrolysis:

- In electrolysis, a **catalyst (like platinum)** is used which reduces the minimum amount of energy required to start a chemical reaction (**activation energy)**, **accelerating water splitting** into **hydrogen and oxygen**.
- The HEA catalyst **reduces platinum use by 7 times** improving efficiency over pure platinum, and remains stable for **100+ hours in alkaline seawater**, enabling **cost-effective hydrogen production**.

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