PGM-free Materials for Oxygen Evolution Reaction in PEM Electrolyzers

Tech ID: 34143 / UC Case 2025-793-0

BRIEF DESCRIPTION

An innovative approach to stabilize non-precious metal catalysts for enhanced efficiency and durability in PEM electrolyzers.

FULL DESCRIPTION

This technology introduces a novel method for stabilizing non-precious metal catalysts used for the oxygen evolution reaction (OER) of proton exchange membrane (PEM) electrolyzers. By employing alkaline exchange membrane (AEM) polymers and other soft matter to create a more favorable local pH environment, this invention significantly reduces the dissolution of metal catalysts in highly acidic conditions, thereby increasing the durability and efficiency of PEM electrolyzers for hydrogen production.

SUGGESTED USES

- Hydrogen production for clean energy, transportation, manufacturing, and agriculture sectors.
- Development of cost-effective and efficient PEM electrolyzers for sustainable energy systems.
- Advancement in materials science for electrolysis and other energy conversion technologies.

ADVANTAGES

- Reduces reliance on expensive precious metals like iridium, lowering production costs.
- Increases the durability and efficiency of PEM electrolyzers by stabilizing non-precious metal catalysts.
- Expands the range of usable materials for OER catalysts by creating a more favorable pH environment.
- Enables the use of low-cost commercially available materials, further reducing costs.
- Offers a versatile and adaptable approach tailored to specific materials used in water electrolysis.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

electrolyzer, chemical process, bipolar electrolyzer, green hydrogen, water electrolysis, PEM water electrolyzer, clean energy, climate change, PGM-free materials

CATEGORIZED AS

- **Energy**
  - Other

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