Clean Technology

Reducing Overpotential Needed to Create Hydrogen by Water Electrolysis

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing methods and materials to reduce the overpotential needed to create hydrogen via water electrolysis.

Overview

Thermodynamically, a specific voltage is required to split water into hydrogen and oxygen. In practice, the actual potential required to oxidize water is greater than the thermodynamic potential. The additional energy requirement, or overpotential, is dependent on the catalyst used and the electrode materials used in the reaction chamber. Platinum generally is considered to have the lowest overpotential; however, considering the cost of platinum and opportunity to use hydrogen as an alternative energy source, finding alternative materials and catalysts to lower the overpotential required for water oxidation is needed.

The Invention

UW–Madison researchers have developed an electrolyzer used to produce gas by electrolysis with a lower overpotential requirement than conventional electrolyzers. The electrolyzer includes a housing, an electrical power source and an electrode comprising a conducting support and a nanoporous oxide coating material.

The researchers also developed a method of using the electrolyzer to produce a gas such as hydrogen by contacting an aqueous solution such as water with the electrode and applying a voltage from an electrical power source. By appreciably reducing the amount of voltage required to convert water to hydrogen and oxygen, this technology enables on-demand hydrogen production for point of use or storage.

Applications

- Development of alternative energy sources
- On-demand production of hydrogen

Key Benefits

- Reduces overpotential requirement to generate hydrogen and oxygen from water through electrolysis
- Utilizes relatively abundant materials, reducing cost of electrode manufacturing

Tech Fields

- Clean Technology : Biobased & renewable chemicals & fuels
- Clean Technology : Energy storage, delivery & resource efficiencies

For current licensing status, please contact Michael Corey at mcorey@warf.org or 608.960.9867.