

ENERGY-EFFICIENT ELECTROCHEMICAL PROCESS FOR HYDROGEN PRODUCTION USING SULPHUR DIOXIDE

Generates hydrogen efficiently at industrial scale by leveraging sulphur dioxide to reduce electricity requirements.

Problem / Market Need

Hydrogen is a critical energy carrier for a low-carbon future, but current production methods are expensive, energy-intensive, and often emit greenhouse gases. Even cleaner methods, like standard water-based processes, require large amounts of electricity, making them costly and difficult to scale for industrial use. With global demand rising for green hydrogen in energy storage, transportation, and industrial applications, there is a pressing need for a more energy-efficient, scalable method that can integrate with existing large-scale energy infrastructure such as nuclear or renewable power systems.

Description of Solution / Technology

This technology generates hydrogen more efficiently by using sulphur dioxide to reduce electricity consumption. The process converts the chemical energy of sulphur dioxide into hydrogen while partially using excess heat, such as from nuclear power plants, to lower the overall energy required. The method is suitable for large-scale hydrogen production and can be integrated with energy generation facilities, renewable power systems, or industrial processes that require hydrogen as a feedstock.

Key Benefits / Advantages

- Lower electricity use than conventional hydrogen production methods.
- Enables large-scale hydrogen generation suitable for industrial and energy applications.
- Uses excess thermal energy from nuclear or other heat sources to improve efficiency.
- Supports energy storage and cost savings by converting energy into hydrogen fuel.

Applications / Relevant Industries

This technology's combination of energy efficiency, thermal integration, and scalability enables applications across multiple sectors, including:

- Energy Generation & Storage: Large-scale hydrogen for grid balancing and energy storage.
- Industrial & Chemical Processing: Hydrogen supply for refineries, fertilizer, and chemical production.
- Clean Fuels & Hydrogen Economy: Hydrogen for fuel cells, transport fuels, and power-to-gas systems.

Stage of Development

Demonstrated at laboratory scale, the technology is ready for pilot testing and integration into large-scale hydrogen production systems.

Intellectual Property Status

Protected by South African Patent ZA 201000807 B (priority 3 Aug 2007; granted 27 Oct 2010), securing exclusive rights to this energy-efficient hydrogen production method.

Opportunity

The technology is available for licensing or co-development with industrial partners interested in large-scale hydrogen production. Potential partners include energy utilities, nuclear operators, hydrogen developers, and chemical companies seeking innovative, energy-efficient hydrogen generation methods. Collaboration could support pilot testing, further development, and integration into industrial hydrogen production systems.



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