

SEMICONDUCTOR-BASED PHOTO REDOX CATALYSTS FOR SUSTAINABLE DEHYDROGENATION REACTIONS

Tech ID: 33673 / UC Case 2025-006-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Conventional methods for dehydrogenation often require harsh conditions and produce harmful by-products. This invention introduces a novel approach using semiconductor-based photo redox catalysts to facilitate sustainable dehydrogenation reactions. The technology, developed by researchers at UC Berkeley, offers a more efficient and environmentally friendly alternative to existing processes by using light energy to drive the dehydrogenation of alcohols and amines. This process not only operates under milder conditions but also promotes the production of valuable chemical products while minimizing waste.

SUGGESTED USES

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The invention can be used to synthesize various compounds such as ketones, aldehydes, and esters through the dehydrogenation of alcohols.

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This technology is applicable for producing high-value chemical products by facilitating the dehydrogenative coupling of alcohols.

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It provides a method for creating important nitrogen-containing compounds, including imines, via the dehydrogenative coupling of amines.

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The invention offers a green chemistry route for a wide range of industrial applications, promoting more environmentally friendly production processes.

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This technology can be employed in the manufacturing of intermediates and active pharmaceutical ingredients, contributing to more sustainable practices in these sectors.

ADVANTAGES

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High Efficiency: The photo redox catalysts enable a more efficient conversion of reactants to products.

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Environmentally Friendly: The process utilizes light energy, reducing the need for high temperatures and harsh chemicals.

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Versatility: The catalysts can be applied to a variety of alcohol and amine dehydrogenation reactions.

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Energy**

» Solar

» **Materials & Chemicals**

» Chemicals

» **Semiconductors**

» Materials

RELATED CASES

2025-006-0

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Cost-Effective: The sustainable nature of the process can lead to reduced operational costs over time.

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Enhanced Selectivity: The catalysts can be designed to favor specific products, leading to higher purity and yield.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Methods to Produce Ultra-Thin Copper Nanowires for Transparent Conductors](#)
- ▶ [CO2 Upgrading into C2 Oxygenates with a CuAg Tandem Electrocatalyst](#)



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