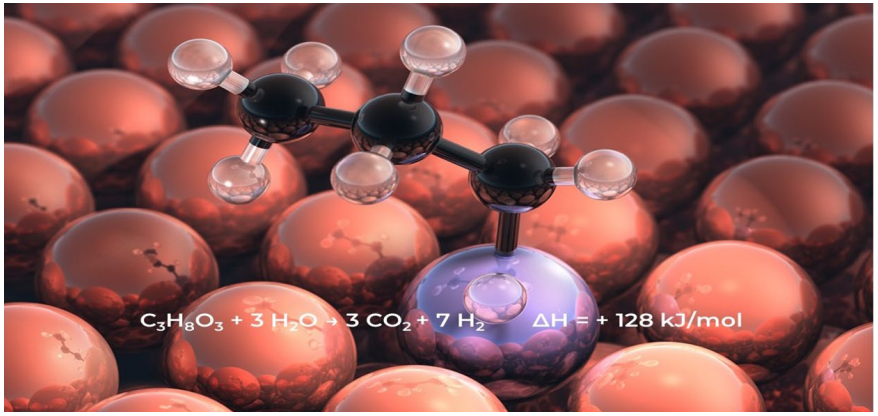
Technology Offer CSIC/JB/002

New high-performance catalyst for multi-cycle fixed-bed steam reforming of glycerol



Novel nickel-based catalyst that offers long-lasting catalytic activity under high temperature exposure and high efficiency for multi-cycle glycerol reforming processes.

Market need

The production of hydrogen from glycerol steam reforming is promising, as glycerol is a byproduct of biodiesel production. However, most commercial nickel-based catalysts supported on CeO_2 and MgO, amomg others and used for long-term steam reforming within an optimal temperature window, generate methane as a byproduct, reducing the efficiency of H_2 production. Moreover, these catalysts are not stable at 900 °C, the temperature required for multi-cycle reforming processes, which is known to offer the most efficient reaction pathway for H_2 production. Therefore, a nickel-based glycerol steam reforming catalyst is required that exhibits high catalytic performance as well as high redox and thermal stability under multi-cycle reforming operating conditions.

Proposed solution

To meet this demand, a new high-performance nickel-based catalyst with high thermal and redox stability is suggested. This highly efficient catalyst is distinguished by its high performance in multi-cycle reforming processes, where high temperatures are achieved and the creation of by-products is prevented facilitating catalytic reforming at an industrial level and improving the mass production of hydrogen. The mixed oxide supports of $MgO\text{-}Al_2O_3$ or $MgO\text{-}Al_2O_3\text{-}CeO_2$ used have a specific surface area of at least 45 m^2/g, which can be increased by means of treatment at high temperatures.

Competitive advantages

- Catalyst with high tunable catalytic surface.
- Great resistance to high temperatures and great redox stability.
- Works under mullti-cycle operating conditions, avoiding the generation of methane and increasing the hydrogen production efficiency at an industrial level.
- The catalyst is able to mantain high catalytic activity after exposure to a high operating temperature.

Intellectual Property

PCT application filed

Intended Collaboration

Licensing and/or co-development

Stage of development

TRL 4-5

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