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Palladium Based Catalyst For Co2 Reduction With High Co Tolerance

Tech ID: 33892 / UC Case 2022-727-0

BRIEF DESCRIPTION

An innovative Palladium hydride catalyst that significantly enhances the electroreduction of carbon dioxide (CO₂) to formate with exceptional tolerance for carbon monoxide (CO).

FULL DESCRIPTION

This technology introduces a hydrogen-rich Palladium (Pd) hydride catalyst, synthesized through a one-step solvothermal process for the electrocatalytic reduction of carbon dioxide (CO₂). This catalyst surpasses commercial Pd catalysts in its efficiency and lifetime, setting a new benchmark for Pd-based catalysts in CO₂ capture and conversion. The superior performance of this catalyst is attributed to its high carbon monoxide (CO) tolerance, which is crucial for maintaining long-term activity and selectivity.

SUGGESTED USES

- » Environmental technology for CO₂ capture and conversion.
- » Manufacture of formic acid, acetate, oxalate, and other valuable chemicals.
- » Renewable chemical synthesis and green energy storage solutions.
- » Industrial processes requiring high-efficiency CO₂ conversion technologies.

ADVANTAGES

- » Exceptional faradaic efficiency of 93.1% towards formate production.
- » Record-setting working lifetime of 4 hours, surpassing current commercial catalysts.
- » High tolerance to CO, overcoming a common limitation of Pd-based catalysts.
- » Derived from a straightforward one-step solvothermal synthesis.
- » Applicable for a wide range of CO₂ electroreduction products beyond formate.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,351,767	07/08/2025	2022-727

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OTHER INFORMATION

CATEGORIZED AS

- » **Energy**
 - » Other
- » **Materials & Chemicals**
 - » Chemicals
 - » Nanomaterials
- » **Research Tools**
 - » Reagents

RELATED CASES

2022-727-0

RELATED MATERIALS

» Guo, S., Liu, Y., et al. Atanassov, P. (2022). Robust palladium hydride catalyst for electrocatalytic formate formation with high CO tolerance. Appl. Catal., B. 316.

STATE OF DEVELOPMENT

Catalysts synthesized and tested on a select scope of substrates.

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