

# Scalable synthesis of electrodes/catalyst for CO<sub>2</sub>RR

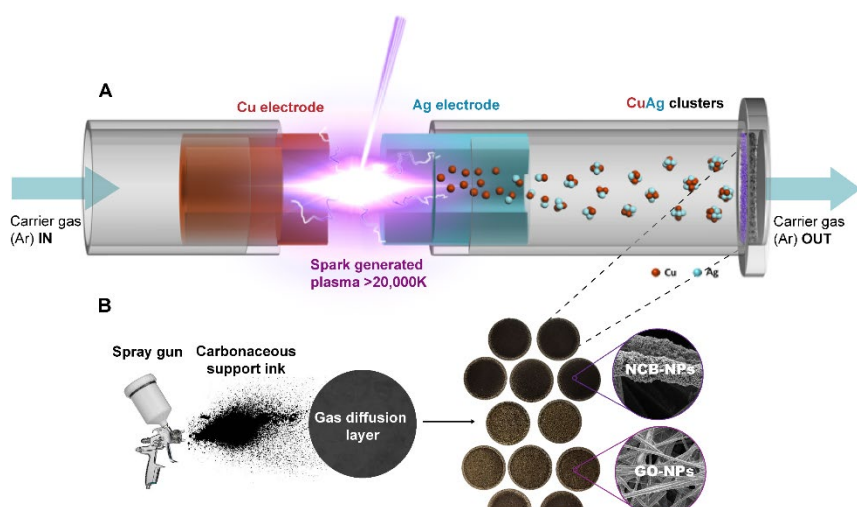


Figure 1 depicts a schematics of a spark ablation (A) and immobilization (B) of Cu(-Ag) oxide clusters on heteroatom doped carbonaceous support GDL

Ref. Nr

6.2401

Keywords

 electrochemical CO<sub>2</sub> reduction reaction, CO<sub>2</sub>RR, green chemistry

Intellectual Property

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Publications

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## Description

electrochemical CO<sub>2</sub> reduction reaction (CO<sub>2</sub>RR) is a promising technology of industrial relevance that can significantly reduce CO<sub>2</sub> footprint by fixating it in useful products. The most valuable products that require carbon-carbon coupling such as ethanol, ethylene and acetaldehyde can only be produced on Cu

Current Cu clusters <2 nm used in CO<sub>2</sub>RR suffer from drawbacks such as: i) low purity, ii) low selectivity and iii) contaminating material such as ligands and surfactants.

The technology enables the production of tunable Cu clusters with different catalytic properties and also overcomes the drawbacks of existing processes.

The technology is demonstrated by the high yield synthesis of acetaldehyde from CO<sub>2</sub>. The process is completely green and consumes only CO<sub>2</sub>, H<sub>2</sub>O and electricity. The

catalyst production process is scalable, does not require any solvents and is compatible with over fifty different elements.

## Advantages

- Low material-cost due to optimal utilization (no dead space).
- High product selectivity due to extremely uniform active sites.
- Catalyst production in the gas-phase at ambient pressure and room temperature.
- Flexibility on catalyst material (>50 elements).
- No solvents required.

## Applications

- Catalyst production
- Electrification chemical industry
- CO<sub>2</sub> sequestration and utilization
- ethanol, ethylene, and acetaldehyde synthesis