

CO. Credit: SARI

A research team led by Profs. Wei Wei and Chen Wei from the Shanghai Advanced Research Institute (SARI) of the Chinese Academy of Sciences have reported a hierarchical micro/nanostructured silver hollow-fiber electrode to boost CO₂ electroreduction.

The [electrode](#) reduces CO₂ to CO with CO₂ conversions exceeding 54% at a high space velocity of 31,000 mL gcat⁻¹·h⁻¹ under [ambient conditions](#), maintaining stable large current densities (~1.26 A·cm⁻²) and high CO faradaic efficiencies (~93%).

The results were published in *Nature Communications* on June 2.

The electrochemical conversion of CO₂ into carbon-based fuels and valuable feedstocks by [renewable electricity](#) is an attractive strategy for CO₂ abatement and renewable energy consumption that can help achieve the goal of carbon neutrality.

CO is the key component of syngas, a mixture of CO and H₂ that can be directly converted into various value-added chemicals via well-developed [industrial processes](#) such as Fischer-Tropsch synthesis, methanol synthesis, etc. Therefore, CO₂ electroreduction to CO is considered one of the most promising means of obtaining cost-competitive products. However, highly efficient CO₂ conversion with high space velocity under [mild conditions](#) remains a challenge.

The hollow-fiber electrode with hierarchical micro/nanostructures in this study is composed of only metallic silver (Ag) for electroreducing CO₂ to CO. Such a porous, hollow-fiber Ag electrode acting as a CO₂ disperser not only enhances three-phase interface reactions but also

guides mass transfers during electrolysis.

Electrochemical results and time-resolved operando Raman spectra demonstrate that enhanced three-phase interface reactions and oriented mass transfers synergistically boost CO production.

This result provides new opportunities for heightening three-phase interface reactions and mass transfer kinetics simultaneously. In addition, it demonstrates that the micro/nanostructured Ag hollow fiber can be an ideal industrial electrode with excellent durability, representing an encouraging advancement in CO₂ electroreduction that may lead to scalable applications.

More information: Shoujie Li et al, Hierarchical micro/nanostructured silver hollow fiber boosts electroreduction of carbon dioxide, *Nature Communications* (2022). [DOI: 10.1038/s41467-022-30733-6](https://doi.org/10.1038/s41467-022-30733-6)

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