

Title: Engineering of the bio/nano-interface for enzymatic CO₂-to-CO conversion and Water- gas-shift-reaction

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Abstract:

The development of specific enzyme-electrode interfaces is a key strategy for improving the efficiency and stability of supported enzymes. In combination with the high conductivity and electroactive area provided by carbon nanotubes, we have developed covalent and noncovalent functionalization strategies, enhancing enzyme wiring and stability. These advances enabled the integration of these stabilized metalloenzymes, CO dehydrogenases and hydrogenases, into gas-diffusion bioelectrolyzers, CO₂ reduction photocatalysis and water-gas-shift-reaction bioelectrochemical cells.

Keywords: Carbon monoxide dehydrogenase, hydrogenase, carbon nanotube functionalization, CO₂ reduction, bioelectrocatalysis