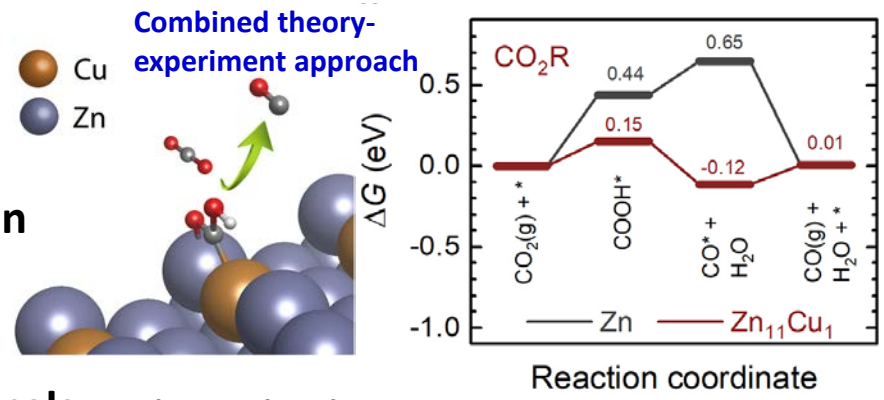
Tuning electrochemical CO_2 reduction (CO_2R) at the catalyst microenvironment: ZnCu bimetallics

LiSA LIQUID SUNLIGHT ALLIANCE

Scientific Achievement

A bimetallic ZnCu catalyst was designed and developed, demonstrating excellent performance for electrochemical CO_2 reduction (CO_2R) to produce carbon monoxide (CO).

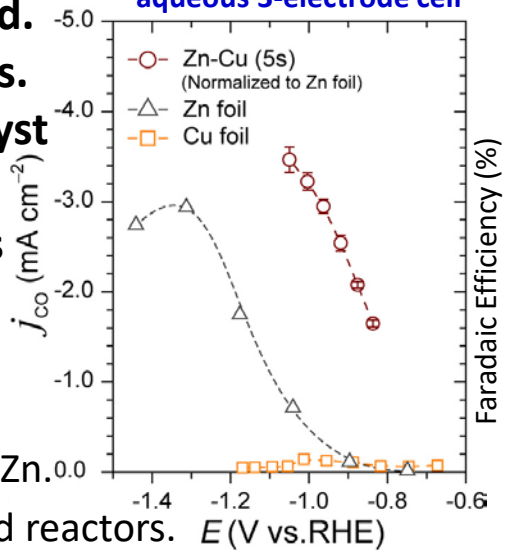
Combined theory-experiment approach



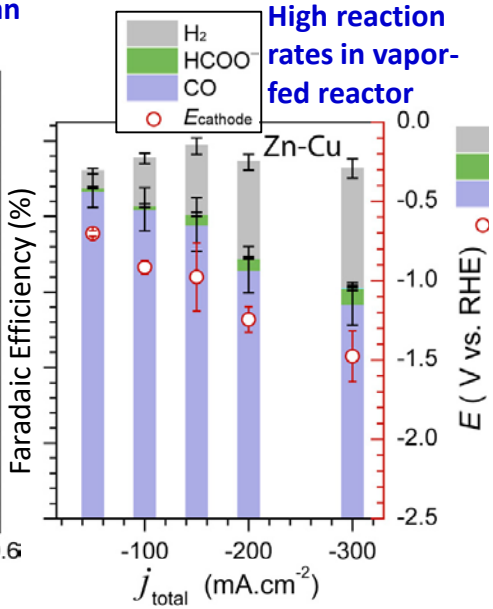
Significance and Impact

Electrifying the production of fuels and chemicals allows for renewable energy to be employed. New catalysts are needed for such pathways. This work shows how, through proper catalyst design at the atomic level, improved performance can be achieved with catalysts comprised of earth-abundant elements.

Fundamental studies in an aqueous 3-electrode cell



High reaction rates in vapor-fed reactor



Research Details

- A combined theory-experiment approach.
- Catalysts prepared by galvanic exchange of Cu-on-Zn.
- Effective CO_2-to-CO in both aqueous and vapor-fed reactors.

L. Wang, H. Peng, S. Lamaison, Z. Qi, D.M. Koshy, M.B. Stevens, D. Wakerley, L. King, L. Zhou, Y. Lai, J. Gregoire, M. Fontecave, F. Abild-Pedersen, T.F. Jaramillo, and C. Hahn, *Chem Catalysis*, 1, 1–18, 2021. https://doi.org/10.1016/j.checat.2021.05.006

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