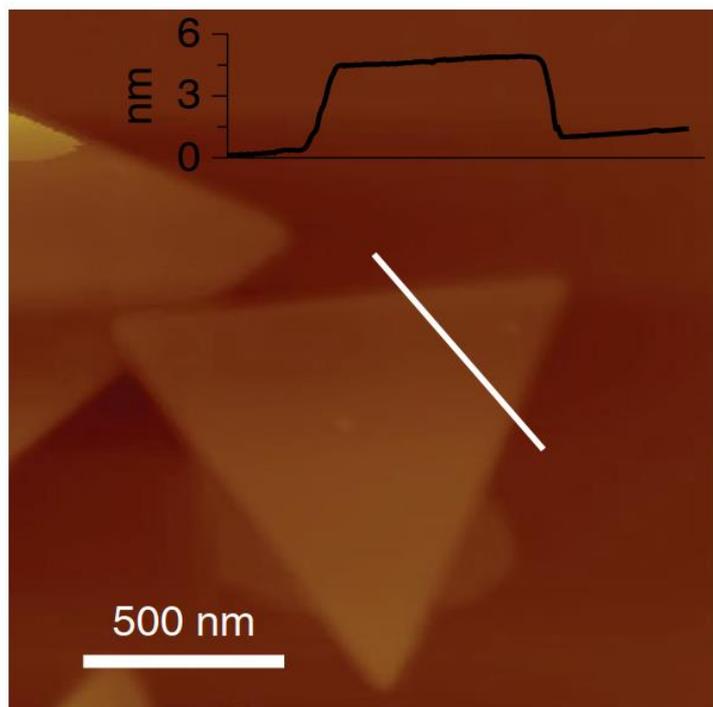


Copper Nanosheets as Improved Electrochemical Catalysts

Atomic force microscope image showing the thickness of a single Cu nanosheet.



W. Luc, X. Fu, J. Shi, J.-J. Lv, M. Jouny, B. H. Ko, Y. Xu, Q. Tu, X. Hu, J. Wu, Q. Yue, Y. Liu, F. Jiao, Y. Kang, *Nat. Catal.* **2**, 423–430 (2019).

Work was performed in part at Brookhaven National Laboratory

Scientific Achievement

Freestanding high-quality copper (Cu) nanosheets were synthesized for the electrochemical reduction of carbon monoxide (CO) and carbon dioxide (CO₂) to acetate.

Significance and Impact

CO₂ electrolysis is attractive for sustainable fuel and chemical production; these findings offer new insights into rational design of CO₂/CO reduction catalysts.

Research Details

- 2D triangular-shaped Cu nanosheets achieved 48% of acetate Faradaic efficiency; the highest value ever reported for CO₂/CO electroreduction.
- The superior acetate selectivity is attributed to the suppression of ethylene and ethanol formation on the Cu(111) surface.
- Operando x-ray absorption spectroscopy at NSLS-II beamline ISS revealed structural stability and the chemical state of the nanosheets during catalysis.