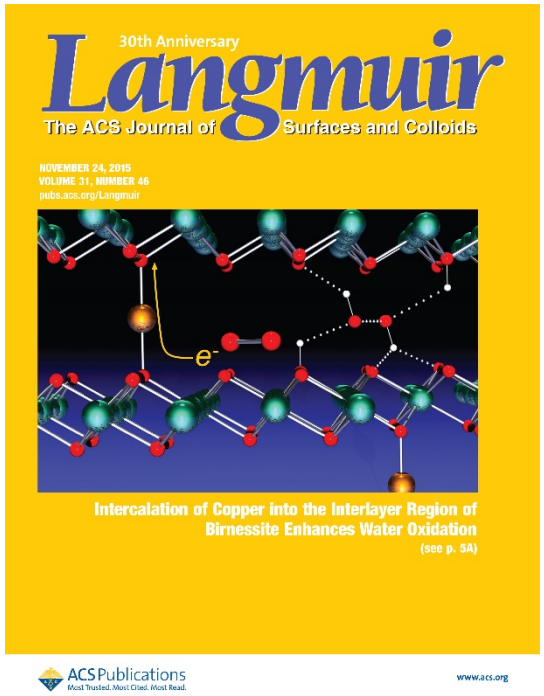
Turning a poor catalyst into an efficient catalyst-Copper Intercalated Birnessite as a Water Oxidation Catalyst



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Qing Kang, Michael Zdilla, Jianwei Sun, Daniel Strongin Langmuir (2015). **DOI**: 10.1021/acs.langmuir.5b02936

Scientific Achievement

Intercalating zero-valent copper into the van der Waals gap increases the water oxidation catalysis of birnessite by enhancing the interlayer charge transfer.

Significance and Impact

Out of plane conductivity governs electrocatalysis in layered materials. Our work proposes a novel method for enhancing out-of-plane conductivity in layered materials, thus improving catalysis.

Research Details

- Zero valent copper can be incorporated into the interlayer region of birnessite by a simple disproportionation reaction of Cu(I)-precursor.
- Electrocatalytic studies reveal that Cu modified birnessite possess improved water oxidation activity over pristine birnessite with lower Tafel slopes and overpotentials.
- Experimental and DFT calculations suggest that copper intercalation reduces the charge transfer resistance and enhances out-of -plane interlayer conductivity.

Work was performed at Temple University