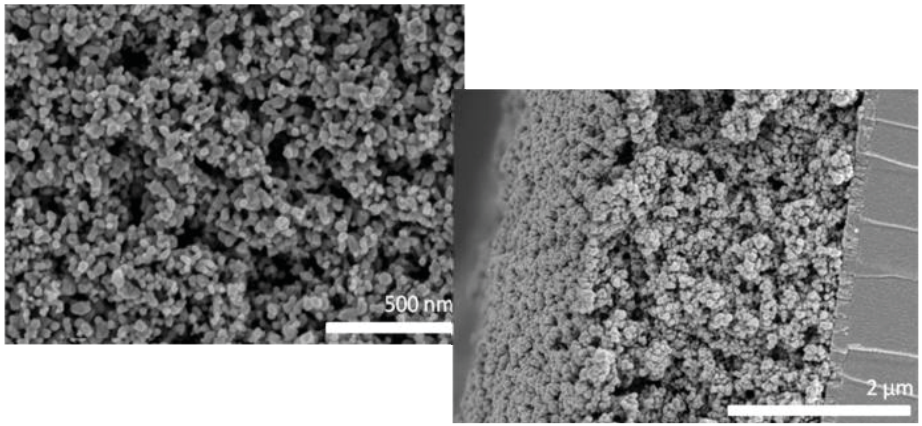
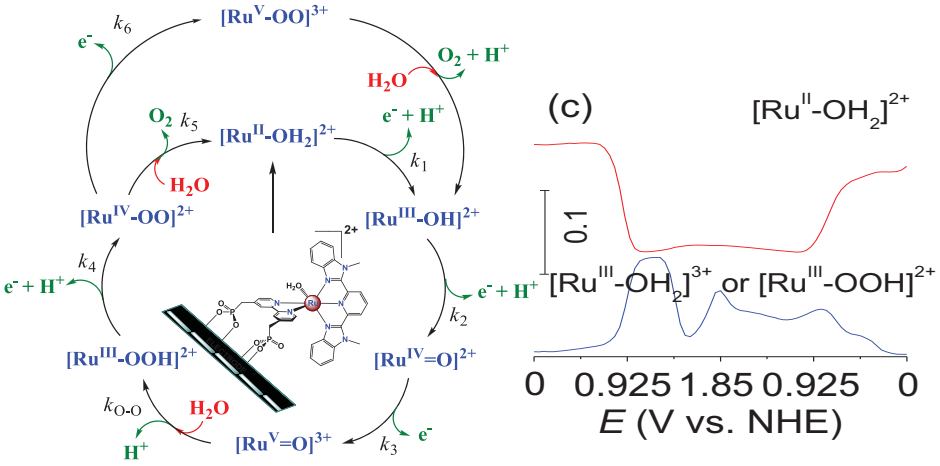
Meyer

U.S. DEPARTMENT OF ENERGY | Office of Science

Catalytic water oxidation on derivatized nanoITO

Z. Chen, J.J. Concepcion, J.F. Hull, C. Kent, P.G. Hoertz*, and T.J. Meyer, UNC Energy Frontier Research Center





Achievement

We report here preparation and characterization of optically transparent *nano*ITO films derivatized with surface-bound chromophores and molecular catalysts at levels comparable to *nano*TiO_2. In contrast to *nano*TiO_2, surface derivatives on *nano*ITO undergo facile interfacial electron transfer allowing for rapid, reversible, potential controlled color changes, direct spectral (rather than current) monitoring of voltammograms, and multi-layer catalysis of water oxidation.

Significance

This study is significant in the goal of devising useful devices and materials for water oxidation catalysis, electrocatalysis, and photoelectrocatalysis. Additionally, the direct/fast electron transfer between the surface couple and *nano*ITO allows for the acquisition of spectral data on electrochemically generated intermediates and for direct spectral monitoring of voltammograms.

Hoertz, P.G.; Chen, Z.; Kent, C.A.; Meyer, T.J. "Application of High Surface Area Tin-Doped Indium Oxide Nanoparticle Films as Transparent Conducting Electrodes." *Inorganic Chemistry* **2010**, 49, 8179-8181.
Chen, Z.; Concepcion, J.J.; Hull, J.F.; Hoertz, P.G.; Meyer, T.J. "Catalytic water oxidation on derivatized *nano*ITO." *Dalton Trans.* **2010**, *39*, 6950–6952.

SOLAR FUELS & NEXT GENERATION PHOTOVOLTAICS

UNC COLLEGE OF ARTS & SCIENCES | Duke UNIVERSITY | NORTH CAROLINA CENTRAL UNIVERSITY | NC STATE UNIVERSITY | RTI INTERNATIONAL | UF UNIVERSITY of FLORIDA