RESEARCH ENERGY CONVERSION AND STORAGE

CNST Center for Nanoscale Science & Technology

Nanomaterials for Extracting Hydrogen from Water

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GOAL

To develop techniques for making fundamental measurements of the nanoscale structure and chemistry of nanomaterials used to catalyze water oxidation.

KEY ACCOMPLISHMENTS

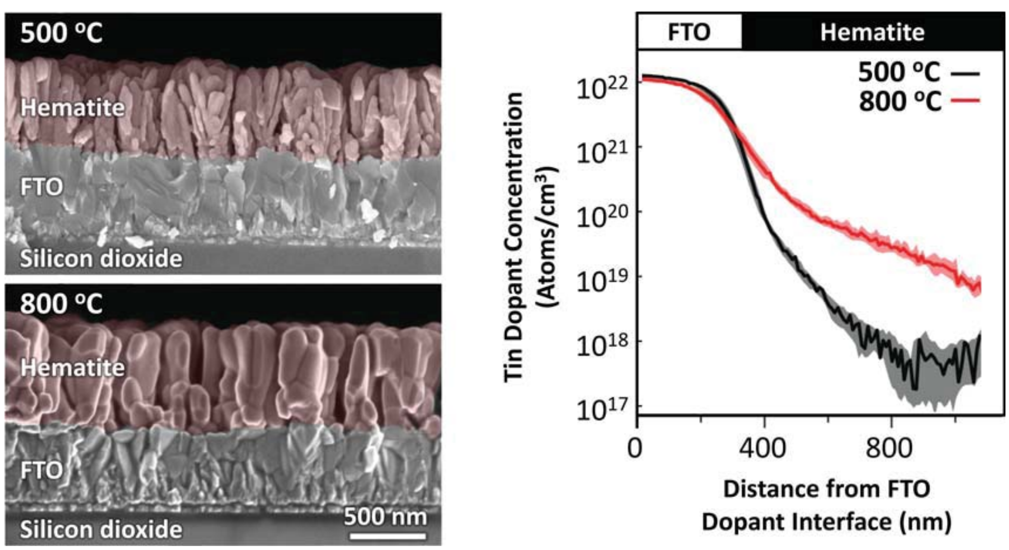
Produced highly active iron oxide (hematite) catalyst samples, and measured and characterized the spatial distribution of tin dopant ions in the material.

Demonstrated that the final location of the dopant atoms and the temperature at which they are incorporated into the catalyst lattice determine the hematite's overall catalytic performance in splitting water.

NEW MEASUREMENT CAPABILITIES

A new set of techniques for controlling and measuring dopant atom concentration in metal oxide catalysts.

False-color scanning electron micrographs of cross-sectioned hematite films grown by sputter deposition and then annealed at two different temperatures. The dopant atom levels in the hematite films differ as a function of distance from the fluorine-doped tin oxide (FTO) dopant source depending on the annealing temperature.



REFERENCE

Effect of tin doping on α-Fe_2O_3 photoanodes for water splitting, C. D. Bohn, A. K. Agrawal, E. C. Walter, M. D. Vaudin, A. A. Herzing, P. M. Haney, A. A. Talin, and V. A. Szalai, *The Journal of Physical Chemistry C* **116**, 15290–15296 (2012).