

Tohoku University Visit, December 8th 2016
Kyle Brinkman

Title

Interfacial Control of Ceramic Composites in Energy Conversion and Storage Applications

Abstract

The emergent properties arising from the interactions of phases including interfacial contributions (surfaces) and phase evolution at the mesoscale present new opportunities, as well as challenges, for materials performance and functionality. Mixed ionic-electronic conductors are widely used in devices for energy conversion and storage. Grain boundaries and surfaces in these materials have nanoscale spatial dimensions, which can generate substantial resistance to ionic transport. In bulk materials composites may be used to enhance the grain boundary ionic conductivity, while surface coatings are used to target enhanced kinetics. Implications for tailored design of ceramic composites in diverse applications such as high temperature separation membranes, solid oxide fuel cells and nuclear waste immobilization will be discussed.

Reference

“Enhancing grain boundary ionic conductivity in mixed ionic–electronic conductors”
Ye Lin, Shumin Fang, Dong Su, Kyle S. Brinkman & Fanglin Chen
NATURE COMMUNICATIONS, 6 (2015) 6824. DOI: 10.1038/ncomms7824