University of Texas at San Antonio

Department of Physics & Astronomy

Dr. Scott A. Barnett

Northwestern University

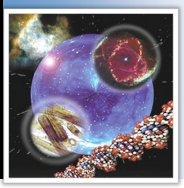
Friday November 19, 2010

Time: 3:00 p.m.-4:00 p.m.

BB 3.04.18

High Efficiency Electrical Energy Storage Using Reversible Solid Oxide Fuel Cells

Large-scale electrical energy storage is becoming increasingly necessary with the growing implementation of intermittent renewable sources such as wind and solar. However, currently available methods generally fail to meet at least one of the key storage-technology targets including cost, efficiency, storage capacity, and widespread availability. Reversible fuel cells have many desirable attributes for energy storage, including (1) the ability to store large quantities of energy, (2) flexibility to reversibly store electricity or to produce fuels (e.g., H_2 or hydrocarbons) from renewable electricity, and (3) ability to operate as a peaking power plant when renewable sources are insufficient. This lecture discusses the issues with adapting fuel cell technology for energy storage, including electrode performance, long-term stability under many cycles, and the limitations of conventional H_2O and CO_2 electrolysis chemistries. A novel storage chemistry is described – the fuel cycles between H_2O-CO_2-rich and CH_4-rich gases, enabled by reduced temperature (~ 600°C) and/or an increased pressure (~10 atm), allowing much-improved storage efficiency.



Department Contact Information
Dr. Andrey Chabanov • 210.458.6426 • Andrey.Chabanov@utsa.edu
Gabrielle Ward • 210.458.5698 • Gabrielle.Ward@utsa.edu
http://physics.utsa.edu/