Abstract Submitted
for the 4CF11 Meeting of
The American Physical Society

Fuel from Water: Nano-structured oxide semiconductor composites for photocatalysis DOUG BALL, Utah State University, FRED WALKER, JOE NGAI, Yale University — Photo-catalytic hydrogen production has been observed using TiO2 as a catalyst to decompose water but has proved impractical in application. The inefficiency of TiO2 is a result of its large bandgap which only permits absorption in the UV range of light and not visible light. Complex oxide-semiconductors are potentially a more effective candidate for photocatalysis of water in that they provide both the electrons from a smaller band gap semiconductor and the catalyst from the oxide surface. We examine an oxide-semiconductor composite of BaTiO3 grown on Ge using the Molecular Beam Epitaxy (MBE) technique by measuring electrical transport to understand the physics of photo-generated carriers. Understanding these electrical transport characteristics will assist in optimizing the efficiency of the nanostructured composite for its eventual use in a reduction reaction of water. The photo-generated surface electrons are observed when the composite is placed in AgNO3 solution and irradiated with visible light. Ag+ reduces because of the available surface electrons forming Ag [solid] grains which are deposited on the surface and observed using a scanning electron microscope with energy dispersive X-ray spectroscopy.

Doug Ball
Utah State University

Date submitted: 28 Sep 2011 Electronic form version 1.4