

MAR09-2009-020407

Abstract for an Invited Paper  
for the MAR09 Meeting of  
the American Physical Society

### **Materials for Sustainable Energy**

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The global dependence on fossil fuels for energy is among the greatest challenges facing our economic, social and political future. The uncertainty in the cost and supply of oil threatens the global economy and energy security, the pollution of fossil combustion threatens human health, and the emission of greenhouse gases threatens global climate. Meeting the demand for double the current global energy use in the next 50 years without damaging our economy, security, environment or climate requires finding alternative sources of energy that are clean, abundant, accessible and sustainable. The transition to greater sustainability involves tapping unused energy flows such as sunlight and wind, producing electricity without carbon emissions from clean coal and high efficiency nuclear power plants, and using energy more efficiently in solid-state lighting, fuel cells and transportation based on plug-in hybrid and electric cars. Achieving these goals requires creating materials of increasing complexity and functionality to control the transformation of energy between light, electrons and chemical bonds. Challenges and opportunities for developing the complex materials and controlling the chemical changes that enable greater sustainability will be presented.