MAR06-2005-004430

Abstract for an Invited Paper
for the MAR06 Meeting of
the American Physical Society

Overview of the Hydrogen Initiative

M. S. DRESSELHAUS, Massachusetts Institute of Technology, Cambridge, MA

One of the Grand Challenges of the 21st Century is to achieve a sustainable energy supply. The 20th Century has seen remarkable advances in Science and Technology, resulting in expectations for a higher standard of living. This has required large increases in global per capita energy consumption. Projections of per capita energy needs for the 21st Century indicate that new technologies for sustainable energy production, storage and use will need to be developed in the next 50 years. The so-called hydrogen economy is one such proposal that is presently being considered worldwide. In this talk the big picture of the Grand Energy Challenge will be presented. In this context requirements of a hydrogen economy will be broadly discussed in terms of hydrogen production, storage and utilization, with emphasis given to the large gap between present science and technology know-how and the requirements in efficiency and cost for a sustainable hydrogen economy. Opportunities for nanoscience and nanotechnology to narrow this gap will be discussed, and examples of recent progress will be presented.