

Nanotechnology Seminar Series

“SOLID STATE HYDROGEN STORAGE & DELIVERY FOR PORTABLE & MOBILE APPLICATIONS;
THERMAL ENGINEERING ASPECTS”



Thursday July 11, 2013
BNC, ROOM 2001, 2–3 PM

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Efficient, economical, & safe storage & delivery is essential for using hydrogen as a fuel in mobile and portable applications. The thermal design of solid state hydrogen storage devices involves coupled heat and mass transfer with heat generation and chemical reactions. Important design considerations include gravimetric hydrogen storage capacity and charging/discharging kinetics. A variety of storage materials such as intermetallics, complex hydrides, carbons, metal organic frameworks, etc. have been suggested, but there was a severe lack of data on their thermodynamic and thermophysical material properties. Analytical and experimental work on the thermal engineering aspects of solid state hydrogen storage has been conducted by the speaker's research group over the past 20 years. Recently, in order to achieve higher gravimetric storage densities, complex hydrides have been investigated. In this talk, the speaker shares his results from this work. Based on his broad experience on solid sorption, other applications, such as carbon sequestration, power generation, and thermal energy storage will also be explored.

Prof. Murthy works at the Department of Mechanical Engineering IIT-Madras in Chennai, India. In a career spanning over 45 years, he has studied the heat & mass transfer aspects of solar thermal power, solid state hydrogen storage, fuel cells, refrigeration, heat pumps, and food processing. While supervising over 30 Doctoral and over 120 Master theses in these areas, he has published over 300 papers. He is a Visiting Professor at universities in Spain, Germany, Australia, etc. At IIT-Madras, he has been the Head of Mechanical Engineering Department, the Dean of Sponsored Research and also an Acting Director. Prof. Murthy is a Fellow of six international and Indian professional academies and societies. He represents India at the Assembly for International Heat Transfer Conferences and is a Member of the Scientific Council of the International Centre for Heat and Mass Transfer. He is the Regional Editor of Applied Thermal Engineering (Elsevier) and is on the editorial boards of several journals including Journal of Energy, Heat and Mass Transfer, Innovative AC&R./ International Journal of Low Carbon Technologies, etc. He is the Chairman of the Advisory Committee on Solar Thermal Systems-Ministry of New and Renewable Energy and Member of Expert Committee on Enabling R&D in Solar Energy-Ministry of Science & Technology. He is the outgoing President of the Indian Society for Heat & Mass Transfer and Vice President of the Solar Energy Society of India. Finally, he is the Co-ordinator at IIT-Madras for the Joint Indo-US research project, SERIUS.

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