

Neutrons and the Prospects for a Sorption Based Hydrogen Storage System

Thursday, 19 September 2013 15:00 (30 minutes)

The substantial effort by many groups around the world to solve the problem of storing large amounts of hydrogen in the fuel tank of a car, along with facile release of and recharging with H₂ at near-ambient conditions, has not yet resulted in a practical system.

One common approach has been to utilize adsorption of H₂ in porous materials, which have favourable adsorption/desorption kinetics, but low capacities at desirable operating conditions because of weak hydrogen binding energies. Various strategies for strengthening the interactions of H₂ in porous materials have been implemented by materials synthesis. These improvements can be understood at a molecular level with the use of inelastic neutron scattering (INS) spectroscopy of the hindered rotations of the hydrogen molecules adsorbed at various sites, particularly when combined with sophisticated computational studies. The results of our systematic studies on a large number of porous materials provide some of the necessary information and thereby give direction to efforts in the synthesis of new materials aimed at reaching the goal of a practical sorption based hydrogen storage material.

The work reported herein is the outcome of a large number of collaborations with many investigators, particularly P. Georgiev, I. Matanović, M. Eddaoudi, M. Zaworotko, O. Yaghi, D. Antonelli, and their groups

Primary author: Dr ECKERT, Juergen (University of South Florida)

Presenter: GEORGIEV, Peter (University of Sofia)

Session Classification: Opportunities for Energy Research