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The Department of Energy's Hydrogen Storage Activities: Challenges and Needs in Chemistry and Chemical Dynamics SUNITA SATYAPAL, GRACE ORDAZ, JOHN PETROVIC[1], CAROLE READ, GEORGE THOMAS[2], Department of Energy — Hydrogen storage is a key area of research funded by the Department of Energy. Hydrogen, the simplest diatomic molecule known, has the highest energy content of all known fuels by mass, but the practical storage of sufficient hydrogen on-board a vehicle is a significant technological challenge. Hydrogen can be stored via various mechanisms within materials such as metal hydrides (e.g. $LiBH_4$, AlH_3) chemical hydrides (e.g. organic liquids), and nanostructured sorbents (e.g. carbon nanotubes, clathrates). Examples of mechanisms include physisorption, chemisorption, dissociative adsorption or combinations of the above. In addition to weight and volume, the kinetics of hydrogen charging and discharging as well as durability must be addressed. A fundamental understanding of hydrogen storage to help optimize materials is critical. The technical requirements for hydrogen storage, as well as some of the promises and challenges will be presented, with a focus on what chemical dynamics and chemistry can offer in solving the challenge of hydrogen storage for transportation applications.

[1]Los Alamos National Laboratory, retired (on assignment to DOE)
[2]Sandia National Laboratory, retired (on assignment to DOE)

Sunita Satyapal
Department of Energy

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