

## Abstract

### Hydrogen Storage Research at Oak Ridge National Laboratory (ORNL)

Timothy R. Armstrong, Ph.D.  
Manager, Hydrogen Research Program  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee, USA  
phone: (865) 574-7996; e-mail: [armstrongt@ornl.gov](mailto:armstrongt@ornl.gov)

M. Jonathan Haire, Ph.D.  
Manager, Depleted Uranium Uses Research and Development Program  
Oak Ridge National Laboratory  
Oak Ridge, Tennessee, USA  
phone: (865) 574-7141; e-mail: [hairemj@ornl.gov](mailto:hairemj@ornl.gov)

Abstract for Plenary Session,  
The Second International Symposium  
“Safety and Economy of Hydrogen Transport” (IFSSEHT-2003)  
Russian Federal Nuclear Center,  
All Russian Research Institute of Experimental Physics (VNIIEF)  
Sarov, Nizhni Novgorod Region, Russia  
August 18–22, 2003

The submitted manuscript has been authored by a contractor of the U.S. Government under contract DE-AC05-00OR22725. Accordingly, the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or allow others to do so, for U.S. Government purposes.

---

\*Oak Ridge National Laboratory, managed by UT-Battelle, LLC, for the U.S. Department of Energy under contract DE-AC05-00OR22725.

## Hydrogen Storage Research at Oak Ridge National Laboratory (ORNL)

Timothy R. Armstrong, Ph.D.  
Oak Ridge National Laboratory  
P.O. Box 2008  
Oak Ridge, Tennessee, 37831-6085, United States of America  
Tel: (865) 574-7996; e-mail: [armstrongt@ornl.gov](mailto:armstrongt@ornl.gov)

M. Jonathan Haire, Ph.D.  
Oak Ridge National Laboratory  
P.O. Box 2008  
Oak Ridge, Tennessee, 37831-6179, United States of America  
Tel: (865) 574-7141; e-mail: [hairemj@ornl.gov](mailto:hairemj@ornl.gov)

### ABSTRACT

Today our world needs assurance of an adequate supply of many commodities, one of the most important of which is energy. The Rerum Novarium postulate says, “In our time, in particular, there exists a form of ownership more important than land: the possession of know-how, technology, and skill.” Knowledge and technology in action, working synergistically to improve survival and standard of living of unprecedented multitudes, are enabling solutions to supply the world’s energy needs. The expanded use of hydrogen as an energy source will help ensure a safer, higher standard of living for the world’s peoples. The objective of this symposium is to advance the knowledge, technology, and skill necessary for the use of hydrogen as an energy source.

A critical component of a hydrogen economy is hydrogen storage. This presentation describes the research on hydrogen storage being conducted at Oak Ridge National Laboratory (ORNL). A particular concern is finding a method of vehicle storage of hydrogen with low weight, low volume, high levels of safety, and fast refueling. Addressing this challenge is a high priority at ORNL and a major goal of the U.S. national laboratories.

A major conclusion derived from this symposium may be that the hydrogen economy is not in the future but has already arrived. The first uses of a hydrogen economy will likely be in the petroleum industry to “lighten” heavy crude oil to make it suitable for gasoline. Furthermore, environmentally clean nuclear power will be a major source of the large amounts of energy needed to produce hydrogen. In fact, 50 years from now, nuclear power may be used more to produce hydrogen than to produce electricity.