



		<p>Tennis Forum for Global Environment</p>	
<p>http://www.chikyu-e.com</p>		<p>http://www.kunaicho.go.jp/03/d03-11ph-</p>	
		<p>28 April 2002 : Twelve Nations participated. How many people can say they have played tennis with His Imperial Highness Prince Norihito Takamado... and let him win?! Cursor on photos for size. Click photos for High-Res</p>	

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Hydrogen .. the clean fuel ... from Liquid Organic Hydrides

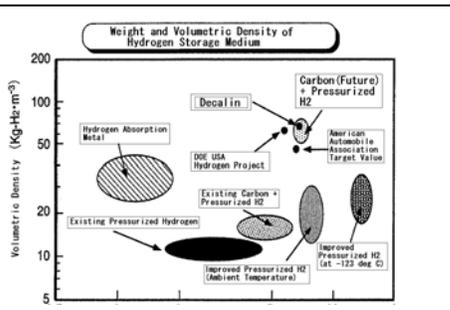
Hydrogen is expected to be the main fuel for the next generation fuel cells. Until now, the storage and transportation technology of hydrogen have been: Pressurized Gas Hydrogen; Liquefied Hydrogen; Hydrogen Absorption Metals. Figure #1 shows a graphical representation of Volumetric vs., Weight density of Hydrogen Storage Media and the target values of DOE and the USA AAA.

Professor Masaru Ichikawa, Catalyst Research Center of Hokkaido University, in June 2001 proposed a series of workshops to develop and materialize a more economical hydrogen storage/transportation system from the use of Liquid Organic Hydrides (LOH). These materials, such as Decalin, are liquids at ambient condition, are lighter, safer, more economical when compared to other hydrogen storage materials and are easily adaptable to present infrastructure such as gas station. Since Jun 2001, three other workshops have taken place (See LOH Workshops insert).

For the LOH to absorb / desorb hydrogen, appropriate catalytic reactions are needed. For instance, the saturated hydrocarbon Cyclohexane and Decalin react to Benzene and Naphthalene discharging 3 molecular and 5 molecular hydrogen, and absorb the hydrogen by the reverse reactions, respectively. (See LOH for FC insert by Prof. Ichikawa). LOH workshops are designed to stimulate scientists to produce catalysts to readily achieve reverse reactions to generate hydrogen quickly and effectively. 45 Japanese companies and many other research organizations attend these workshops. Exciting solutions to obtain hydrogen from LOH started to emerge only one year after the first Workshop:

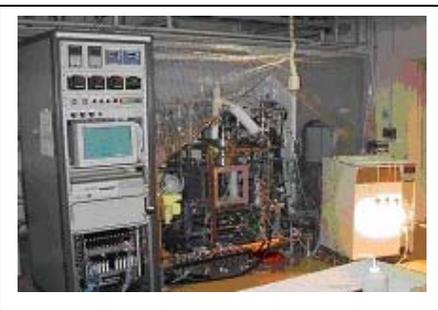
1. Professor Masaru Ichikawa, Catalyst Research Center of Hokkaido University, has developed a reactor that could produce the hydrogen very rapidly by spraying Decalin to Pt catalyst at 250-380 deg C. Moreover, Professor Ichikawa has started a joint development program with Sekisui Chemical to produce 1-3 kW electric power generator using a spray type high-speed hydrogen production reactor (Figure # 2).
2. Professor Y. Saito, Tokyo University of Science, has also studied the reaction kinetics on the Pt-carbon catalyst. He reports that the dehydrogenation of decalin takes place effectively on the catalyst surface under the dry -wet condition at the temperature region of boiling/refluxing for decalin. The LOH technology, once developed, will be used not only by automobiles and stationary type fuel cell battery, but also wireless household electric equipment, personal computer, and information/communication equipment since this technology does not require a reformer.

Figure 1: Weight and Volumetric Density of Hydrogen Storage Media. **Figure 2:** Rapid Hydrogen Production Test Plant using Cyclohexane / Decalin for 1-3KW Stationary Fuel Cell Battery.



"LOH Workshops.doc"

LOH for FC.doc



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