

Title: Storage of renewable energy by Liquid Organic Hydrogen Carrier

Abstract:

1. Introduction

Storage of huge quantities of energy, for example for seasonal storage of solar energy, is most reasonably done in form of hydrogen. A number of different possibilities exist (Fig. 1). The most reasonable way is the storage of hydrogen on a liquid substance, in a so called Liquid Organic Hydrogen Carrier (LOHC).

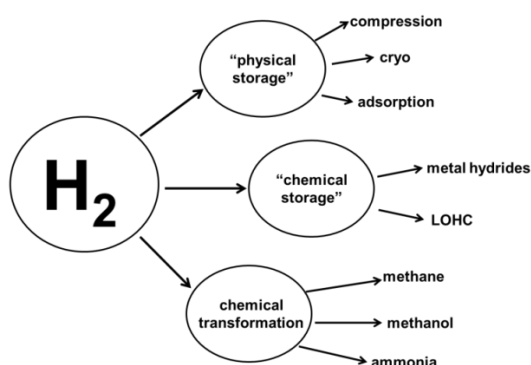


Fig. 1: Possible utilization and storage routes for hydrogen.

2. Energy storage based on LOHC

The LOHC concept is based on the reversible hydrogenation of an aromatic compound for hydrogen uptake. After taking up the hydrogen the LOHC can be stored safely at ambient conditions with a high storage density.

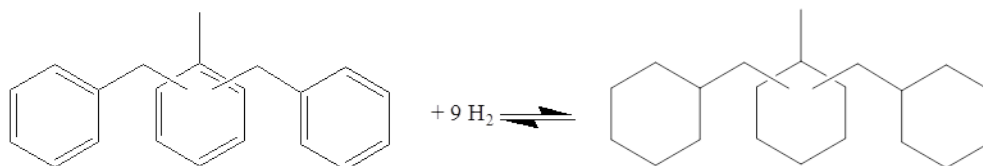


Fig. 2: Reaction scheme for the hydrogen uptake by dibenzyltoluene.

3. Application of LOHC for storing solar energy or for mobility

Hydrogenation of dibenzyltoluene using hydrogen from solar driven electrolysis as well as recovery of electrical energy from hydrogenated dibenzyltoluene has recently been demonstrated.

Mobility is based on liquids as an energy source. LOHC can replace gasoline and Diesel without larger modifications of the infrastructure and the storage system. Hydrogen can be used in combustion engines or in fuel cells.

Bio:

1972-1981 study of chemical engineering at Dortmund university, PhD with Prof. Onken
1982-1992 engineer at Bayer AG in Leverkusen, Krefeld and Antwerp
1993-2004 Full professor Technical University of Berlin
1998 professorship offer by TU Dresden: refused
2004- Full Professor and chair at University of Erlangen and director of the high pressure laboratory; director of Energy Campus Nuremberg

>200 publications + books (Dechema Chemistry Data Series)

>80 patents (national and international)

former main referee German National Science Foundation (DFG)

Editor of Chemie-Ingenieur-Technik/Chem. Engineering Technology

member of numerous societies (VDI, process-net, AIChE)

Advisor to the Bavarian government

Hobby: blue water sailing