

## **Liquid Organic Hydrogen Carriers (LOHCs) - Hydrogen Storage in Fuel-Like Manner**

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### **Abstract**

Global logistics of renewable energy equivalents will create additional driving force towards a future hydrogen economy. However, the special nature of H<sub>2</sub> requires dedicated infrastructures and this has prevented so far its massive introduction to the energy sector.

Recent scientific and technological progress in handling hydrogen in chemically bound form as **Liquid Organic Hydrogen Carrier (LOHC)** supports the technological vision that a future hydrogen economy may work without handling large amounts of elemental hydrogen using the existing infrastructure for fuels. LOHC systems are composed of pairs of hydrogen-lean and hydrogen-rich organic compounds that store hydrogen by repeated, catalytic hydrogenation and dehydrogenation cycles.[1]

The contribution will highlight fundamental and applied aspects of LOHC hydrogenation and dehydrogenation catalysis and the related processes. It will focus on the development of optimized catalytic materials for LOHC hydrogenation/dehydrogenation, on LOHC charging with gas mixtures and on operational stability aspects gained from demonstration units. Application scenarios for stationary energy storage systems, hydrogen logistics and mobile applications will be discussed.

[1] P. Preuster, C. Papp, P. Wasserscheid, Acc. Chem. Res. 2017, 50(1), 74-85.