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Nobukazu Hoshi
Tokyo University of Science, Japan

Abstract

Title: Toward a Hydrogen Energy Society

Hydrogen is attracting attention as a clean energy source because it does not emit carbon dioxide during combustion or power generation. In addition, because hydrogen can be extracted from various resources, it is also expected to reduce energy supply and procurement risks.

Technological development is crucial at each generation stage, transportation, storage, and utilization of hydrogen and other energy sources. Methods of extracting hydrogen include natural gas reforming and electrolysis of water using electric power. Transportation methods include hydrogen gas pipelines, high-pressure compressed hydrogen gas cylinders, liquid hydrogen in tanks, and hydrides. Storage methods include high-pressure compressed hydrogen gas cylinders, liquid hydrogen storage, hydrogen-absorbing alloys, and hydrides. Hydrogen energy is mainly used in three ways: it can be converted into kinetic energy by a hydrogen engine, electrical energy by a hydrogen engine generator, or directly into electrical energy by fuel cells.

This lecture will introduce the characteristics of sodium borohydride (SBH), one of the hydrogen energy carriers, a hydrogen generation method from SBH, several utilization technologies, and the technical challenge of SBH toward a hydrogen society.