

EHA National Association Meeting, October 30, 2007, Brussels

**Current present activites in
Hungary**

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List of activities

- **Autumn 2006:** Hydrogen Forum was organised in Budapest by the Hungarian Energy Society (MET).
- **Hydrogen Forum:** participants representing
 - the industry (energy sector),
 - R+D,
 - bank sector, and
 - decision makers
- **The idea to create Hydrogen Society within the frame of Hungarian Energy Society (MET) was formulated at the above meeting**

List of activities

- The Hungarian Hydrogen Association of MET was officially organized first months 2007. It has about 50 members.
- The Hydrogen Association joined to the **EHA** and to the **International Association for Hydrogen Energy**.

Our main goals

- **Providing sufficient and proper information and a right forum for individuals, institutions and companies interested in the area of „hydrogen technologies” including fuel cell research and development.**
- **Establishment of proper relationship with international organizations with the aim to provide an opportunity for Hungarian parties to join to international R+D programs in the field of hydrogen technologies and fuel cell development.**
- **Providing information for decision makers in the area of energy, environmental protection, transportation, chemical technologies and materials research**
- **Creating a basis for the establishment of „hydrogen technologies” and related areas.**

Progress and problems

- The term „hydrogen” as a source of energy has already been mentioned in a recent strategic review „*Future energy strategy in Hungary*” issued by the Ministry of Economy.
- The use of hydrogen has also been described in a review related to the use of „Renewable energy sources”.
- Unfortunately, none of the above documents focuses on the use hydrogen as a real source of energy, and they do not evaluate correctly the potential strength of „hydrogen energy”. For this reason there is no possibility to include the topic „Hydrogen technologies” into the general „National Development Programs” in Hungary
- Our aim is to use our EHA membership to accelerate the process for the introduction the topics related to „hydrogen technologies” into the future National programs having primary priority.

Survey in Hungary

**Academic research related to
„hydrogen technologies”**

Hydrogen technologies

Synthesis

Cleaning

Storage

Applications

- **New materials are needed for all of the above areas.**
- **The development of these new materials requires new approaches and new methods.**

In technologically developed countries High-Throughput Experimentation and Combinatorial Approaches are applied

Hydrogen technologies

Synthesis

Sources of hydrogen:

- Methanol
- Ethanol
- Glycerol
- Biomass
- Water

Processes applied:

- Catalytic reforming
- Water gas shift reaction
- Photo-catalysis
- Electrolysis
- Water splitting

Hydrogen technologies

Cleaning

The main task is:

Selective removal of CO from hydrogen rich gas mixtures

(PROX)

(Preferential Oxidation)

PROX is a catalytic process requiring highly active and selective heterogeneous catalysts

Hydrogen technologies

Storage

The main task is:

Development of selective adsorbents

Hydrogen technologies

Applications

Fuel cells

The main task is:

Development of highly economic Polymer Electrolyte Membrane Fuel Cells (PEMFC)

R+D tasks:

- **New catalysts for cathode**
- **New catalysts for anode**
- **New proton conductive membranes**

Key players in Hungary

- **Chemical Research Center (CRC)**
 - Catalytic removal of CO (PROX)
 - Ethanol reforming
 - Anode and Cathode catalysts for PEMFC
 - Modified composite membrane materials
- **Institute of Isotopes**
 - Catalytic removal of CO (PROX)
- **University of Szeged**
 - Ethanol reforming
 - New adsorbents based on carbon nanotubes
- **Eötvös Lorand University, Budapest**
 - New metal hydride-type adsorbents

**Thank you for your kind
attention**