Off-board storage, stationary applications, hydrogen transport

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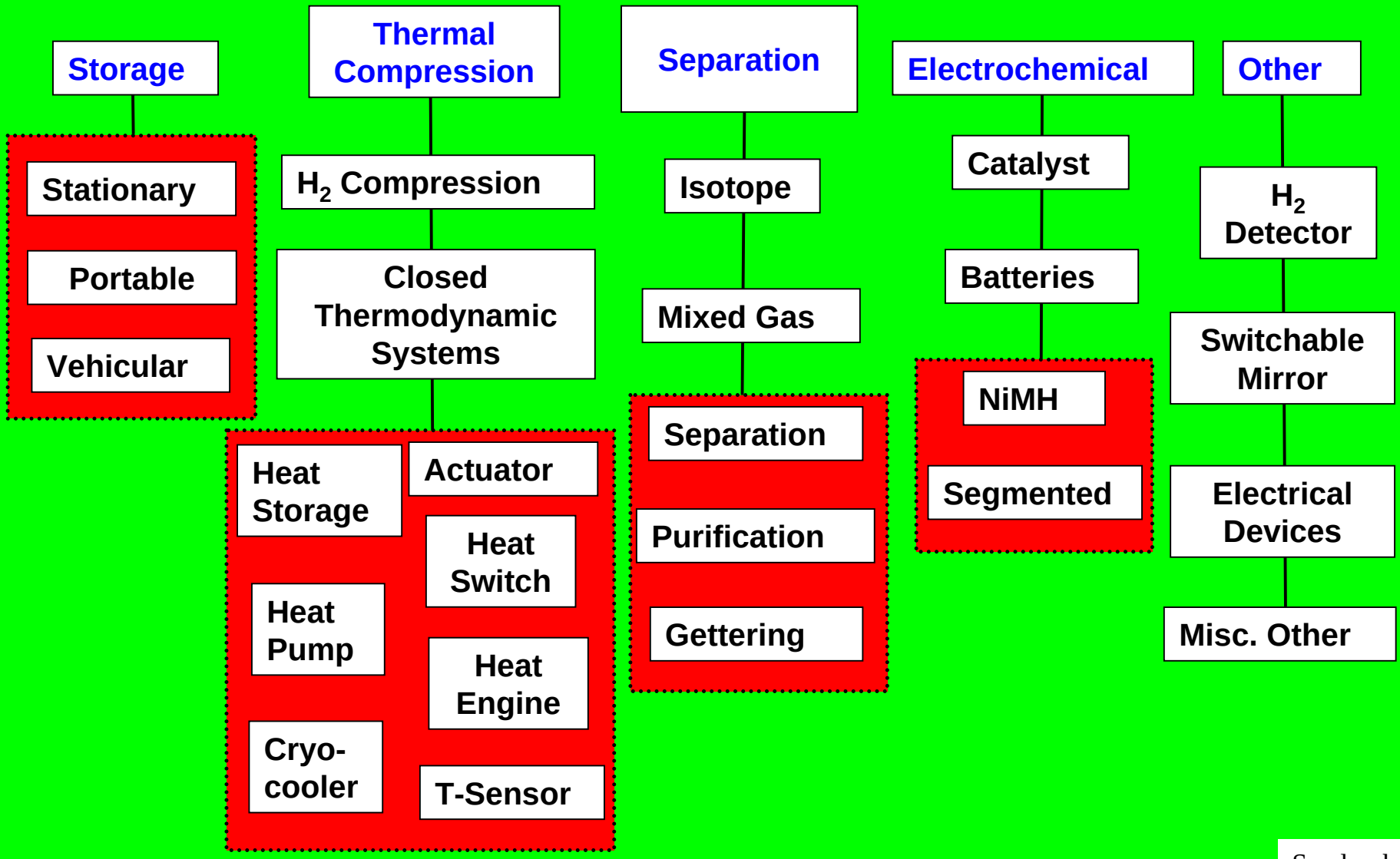
Family of Hydride Applications



Sandrock, 2002

- Oral Presentations
  - D. Fruchart (France): Three classes of metal hydrides: The HYSTORY-EU Consortium
  - E. Akiba (Japan): Hydrogen storage using hydrogen absorbing alloys
  - S. Mitrokhin (Russia): Stationary storage of hydrogen: Modified titanium based alloys

Poster Presentations *(not Mg)*

- A.L.Shilov (Russia): PRESSURE HYSTERESIS IN METAL-HYDROGEN SYSTEMS
- P. Moretto (EC): MICROSTRUCTURAL AND HYDROGEN SORPTION PROPERTIES OF THE $LaNi_{5-X}Al_X$-H_2 SYSTEM
- D.O. Lazarev (Russia): HYDROGEN ABSORPTION FROM GAS MIXTURE IN A METAL-HYDRIDE REACTOR: MATHEMATICAL MODEL AND NUMERICAL RESULTs
- G. Restuccia (Italy): THERMOGRAVIMETRIC MEASUREMENT AND MODELING OF THE HYDROGEN SORPTION KINETICS ON $LaNi_5$

Poster Presentations *(Mg)*

- A.Ye. Yermakov (Russia): THERMODYNAMICS, HYDROGENATION KINETICS AND NMR INVESTIGATION OF DOPED MAGNESIUM HYDRIDES
- K.B. Gerasimov (Russia): ROLE OF MgO AS SINTERING INHIBITOR IN HYDROGEN ABSORPTION BY Mg AND Mg-BASED ALLOYS
- Y. Yoo (Canada): PROTON CONDUCTIVE CERAMIC CATALYSTS FOR ENHANCING HYDROGEN REACTION KINETICS OF NANOSTRUCTURED MG-BASED COMPOSITES
- A. Miotello (Italy): HYDROGEN STORAGE IN NIOBIUM DOPED MAGNESIUM
- B.P.Tarasov (Russia): MAGNESIUM BASED COMPOSITES FOR HYDROGEN STORAGE
- G. Principi: HYDROGEN STORAGE IN NANOSIZED Mg-Ni(Fe) ALLOYS
- S.R. Johnson: CHEMICAL ACTIVATION OF MgH_2; A NEW ROUTE TO SUPERIOR HYDROGEN STORAGE MATERIALS
- D. Noréus: STRUCTURAL INVESTIGATIONS OF NEW TERNARY MAGNESIUM-NIOBIUM HYDRIDES, $Mg_{6.5}Nb_{H\sim14}$ and $MgNb_2H_{\sim4}$

Scientific and technical status of available storage materials

- Many low temperature hydrides available (AB_5, AB, AB_2, BCC SS, nanocrystalline Mg alloys & composites, etc)
- These alloys (except Mg) can be fine tuned thermodynamically and offer ~2 wt% capacity at RT. They are still being improved. (Mg offer 6+ wt% capacity but cannot be so easily tuned).
- Many secondary (nonthermodynamic) properties are unknown; the exact requirements of the applications are not always clear.

- What are the important secondary properties for stationary applications?
  - Cost (raw materials & production)
  - Optimum manufacturing (especially Mg nanoparticles)
  - Safety (pyrophoricity, et al)
  - Cyclic life (gaseous impurity effects)
  - Cyclic life (disproportionation)
  - Thermal conductivity, heat management
  - Any real thermodynamic advantages to nanosize?

- Summary of ongoing collaborations
  - IEA HIA (numerous)
  - EC (HYTRAIN, HYSTORY, others)
  - Bilateral/regional R&D agreements
  - Others

- Summary of suggested new IPHE collaborations.
- Economic analyses of production techniques (especially for nanosized powder)
- System designs and duty cycle analyses. What are the cost and property requirements the storage material developer must use as targets? How do the targets change with various non-vehicle applications?
- Systematic safety studies.
- Determination of non-kinetic advantages of nanosizeed particles.