Contribution ID: **82** Type: **Poster**

Liquefaction of Li-Mg-N-H hydrogen storage system by LiBH4 as a way to accelerate its dehydrogenation

Friday 6 December 2024 13:45 (3 hours)

Hydrogen storage in light hydrides for mobile applications is a widely discussed but highly controversial topic. Is it safe enough? Is it effective enough? Does hydrogen energy have a future? The questions are numerous and multifaceted but almost none of them has a clear answer so far. A complex hydride system 6Mg(NH2)2:9LiH with LiBH4 as a dopant is one of promising candidates on a role of on-board hydrogen storage, since it it actively decomposes already at the 180oC, releasing only hydrogen. The role of the LiBH4 is expressed in forming of an low-melting liquid-phase with high hydrogen mobility with an intermediate product LiNH2, which highly enhances the rate of the dehydrogenation reaction. There are 2 mixed phases with a high Li-ion conductivity described: a metastable Li2BH4NH2 and a peritectically melting Li4BH4(NH2)3, and both of these phases were registered while performing DSC and XRD measurements. This 2-component system is investigated and a number of ratios was analyzed and thereupon a phase diagram was created. Its lowest melting point, i.e. eutectic point is located at 33% LiNH2 and at 90oC. The behavior under heating and the intrinsic structure of this eutectic composition was investigated by neutron total scattering. The composition corresponding to this eutectic mixture would be 6Mg(NH2)2:9LiH:6LiBH4.

Primary authors: Dr GIRELLA, Alessandro (Pavia Hydrogen Lab); KUZNETSOVA, Anastasiia (WPN Hereon Garching branch); Prof. MILANESE, Chiara (Pavia Hydrogen Lab, Department of Chemistry - Physical Chemistry Division University of Pavia); Prof. PISTIDDA, Claudio (Helmholtz-Zentrum Hereon, WTN); Prof. MÜLLER, Martin (Helmholtz-Zentrum hereon GmbH); Dr ALDERMAN, Oliver (SANDALS, ISIS); Dr BUSCH, Sebastian (GEMS at MLZ, Helmholtz-Zentrum Hereon, Germany)

Presenter: KUZNETSOVA, Anastasiia (WPN Hereon Garching branch)

Session Classification: Poster Session

Track Classification: Material Science