

EFFECT OF Y CONTENT ON THE STRUCTURAL AND SORPTION PROPERTIES OF A_2B_7 -TYPE LA-Y-NI BASED HYDROGEN STORAGE ALLOY

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Abstract

RE-Mg-Ni-based hydrogen storage compounds have been extensively studied due to their high electrochemical storage capacity and structural stability. However, the high vapour pressure of Mg means that the composition is difficult to control during conventional industrial production methods. By replacing Mg with Y, similar electrochemical and structural properties were demonstrated without the inherent problems of production using Mg [1-3]. In this work, we investigated the effect of Y content on the gas sorption properties of A_2B_7 -type La-Y-Ni-based alloys in relation to their composition and crystal structure. X-ray and neutron diffraction were performed at the MCX beamline of the Elettra Synchrotron (Trieste, Italy) and at the diffractometer BT-1 of NIST (USA), respectively. It was found that an increased amount of Y modifies the phase compositions from an almost pure Ce_2Ni_7 -type phase to a mixture of phases. Pressure composition isotherms were collected at various temperatures in the range 50-90 °C and showed the influence on the Y content on the enthalpy of formation and plateau pressures. Investigations on the samples' thermal transfer were performed on a C-Therm Trident confirming that compaction increases the thermal conductivity of the powders.

References

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My name is Emil, and I graduated from Aarhus University with a bachelor's degree in Nanoscience in 2015. In 2015, I went to China as a part of the Sino-Danish centre program where I completed a master degree in Nanoscience and Nanotechnology. Currently, I work as a PhD candidate at the University of Oslo, where I focus on materials for hydrogen storage.