Experiment 08-02-660, BM08

Title: In-situ XRD and EXAFS study of the de-hydrgenation kinetics in NbH-doped MgH_2 thin film

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Experimental conditions: XAS and XRD measurements upon annealing of samples in vacuum at 350-400 C. Monochromator: Si 311. Beam focused horizontally (monochromator) and vertically (mirrors).

Samples: Nb-doped MgH2 powders

We have monitored in-situ the crystalline structure of the samples during and after MgH2-to-Mg phase transition (H desorption). In particular, the lattice parameter of NbHx metastable phase was measured by both XAS and XRD. Data quality for both XAS and XRD was very good. In figure preliminary results from XRD are shown:

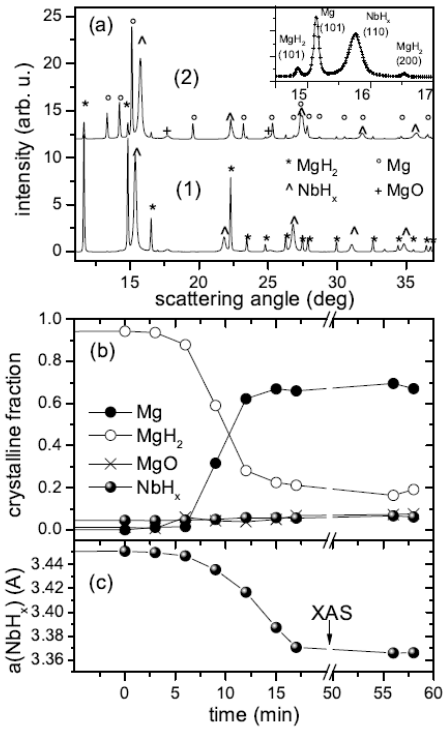

FIG. 1. (a) XRD radially integrated powder diffraction pattern recorded during annealing at 350 °C, before and after MgH_2 to Mg phase transition. Inset: zoom in the region 2θ=14.5-17.0 deg (data indicated by markers, fit by a solid line). (b) Fraction of the different crystalline phases and (c) lattice parameter of the NbH_x phase (from XRD) during H desorption.

These have been compared to the EXASF results. A paper is submitted.