

## Hydrogen absorption in Gd thin films

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Rare earth metals are of great scientific interest because of unusual electronic and magnetic properties which arise from their highly localized 4f electrons. Adsorbates can significantly alter the electronic structure of the underlying substrate and are additionally of great importance in technological processes, e.g., heterogeneous catalysis. In this contribution we have studied in-situ an initial hydrogen absorption in Gd thin films using X-ray photoelectron spectroscopy (XPS). As an initial hydrogen absorption indicator we have used broadening of the Gd-4f peak. The Gd thin films with a thickness from 50 nm to 200 nm were deposited at room temperature (RT) using UHV RF magnetron sputtering. As a substrate we have used naturally oxidised Si(100) wafers with and without Pd buffer layer. Results showed, that due to Gd-Pd alloy formation near interface the initial hydrogen absorption is greater for the Gd samples deposited directly on the Si substrate without Pd buffer layer. Furthermore, hydrogen absorption and desorption kinetics up to 1000 mbar in Pd covered 200 nm – Gd thin films were studied at RT using four-point resistivity measurements and X-ray diffraction. Magnetic susceptibility measurements revealed Gd-Pd alloy formation for “as prepared” samples and a magnetisation decreasing for hydrogenated thin films.