



XAS investigation of Switchable Mirrors (4)

岡島 敏浩¹, Iesari Fabio¹, 平田 璃子², 汪 佳欣², 重里 有三²
1 あいち SR, 2 青山学院大学

キーワード : **switching mirror, thin film, phase change**

1. 背景と研究目的

Switchable mirrors^[1] are thin film materials that undergo a reversible transition upon hydrogenation and dehydrogenation. In normal condition, they are in a metal state, with high thermal conductivity and a mirror-like appearance. However, when exposed to hydrogen, helped by a thin Pd layer serving as a catalyst, they change to a semi-conductor phase, becoming transparent and exhibiting low thermal conductivity. These distinctive properties make them promising candidates for applications as thermal switches.

2. 実験内容

We measured two different types of switchable mirrors. One was made by a composition of Mn and Mg, with a 5 nm layer of Pd. Measurements were done at Mn K-edge in fluorescence mode, by putting the sample at 45° angle with respect to the incoming beam. The second sample was prepared using Gd, with 5 nm layer of Pd for hydrogen catalysis. Measurements were done at Gd L₃-edge for samples prepared in different conditions

3. 結果および考察

In Fig. 1, the Mg K-edge XANES for the first type of sample is shown. In Fig. 2, the Gd L₃-edge for different samples are shown. Each sample has been prepared with a different percentage of H₂ atmosphere. Analysis of the XANES and EXAFS spectra will give insights into the structural properties of these types of switchable materials.

4. 参考文献

1. Huiberts, J., Griessen, R., Rector, J. et al. Yttrium and lanthanum hydride films with switchable optical properties. Nature 380, 231–234 (1996).

