Pressure-induced hexagonal to cubic transition in the Yttrium and Rare-Earth trihydrides

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Since there is much interest in the physics of rare-earth hydrides after discovery of the "switchable mirror" behaviour of Yttrium hydrides by Griessen's group in 1996 [1], we have undertaken structural study of these hydrides under high pressure using Energy Dispersive X-ray Diffraction (EDXRD) mode in Diamond Anvil Cell (DAC). We have focused on the several rare-earth trihydrides (REH₃, RE = Sm, Gd, Ho, Er, Lu) [2,3] and YH₃ [4]. The **hcp** to **fcc** structural transformation have been observed for the all trihydrides investigated and the lattice parameters and parameters of equation



Figure 1. The EDXRD patterns (a) and the pressure-volume relation (b) of HoH₃ are the typical examples for YH₃ and REH₃ family.

of state (EOS) for both phases of each trihydride have been evaluated. Systematic classification of the phase transition has been established.

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[2] T. Palasyuk. M. Tkacz, Solid State Comm. 2004,130, 219-221

- [3] T. Palasyuk. M. Tkacz, Ibid. (in press, on-line available)
- [4] T. Palasyuk. M. Tkacz, Ibid. (in press, on-line available)