Magnetic properties of the R_2MgCo_9 (R = Y, Nd, Tb) compounds and $Nd_2MgCo_9H_{11.4}$ hydride

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New R_2MgCo_9 (R = Y, Nd, Tb) compounds have been synthesized by powder sintering method and corresponding hydrides have been prepared by solid gas method. Their crystal structure and magnetic properties have been systematically studied. X-ray diffraction analysis showed that all R_2MgCo_9 compounds belong to the $PuNi_3$-type structure. The $Nd_2MgCo_9H_{11.4}$ hydride preserves $PuNi_3$-type structure with hydrogen-induced volume expansion 16.7 %. The influence of the R element on the magnetic properties of R_2MgCo_9 compounds have shown that R_2MgCo_9 (R = Y, Nd) compounds are ferromagnetic (ferrimagnetic for Tb) with high Curie temperature T_C = 612, 635 and 525 K respectively. A spin reorientation at 407 and 225 K have been observed for R_2MgCo_9 (R = Y, Nd) respectively. Hydrogenation of Nd_2MgCo_9 causes the decrease of the transition temperatures due to a weakening of the magnetic interactions and probably a change of magnetic order (to antiferromagnetic with T_N = 265 K) and various spin reorientations at lower temperatures [1].

References:

[1] V.V. Shtender, R.V. Denys, V. Paul-Boncour *et al.*, J. Alloy. Compd. 695 (2017) 1426–1435.