Mössbauer spectroscopy investigation of YFe$_x$Co$_{2-x}$ (x = 0.03 and 1) compounds

Z. Śniadecki, M. Kopcewicz, N. Pierunek, R. Puźniak, A. Wiśniewski, and B. Idzikowski

$^{1}$Institute of Molecular Physics, PAS, Poznań, Poland
$^{2}$INT, KIT, Eggenstein-Leopoldshafen, Germany
$^{3}$Institute of Electronic Materials Technology, Warszawa, Poland
$^{4}$Institute of Physics, PAS, Warszawa, Poland

YCo$_2$ compound is an exchange-enhanced Pauli paramagnet on the verge of being magnetic. Ferromagnetic long-range ordering can be induced by topological or chemical disorder [1]. The influence of Fe substitution and quenched-in topological disorder on the magnetic properties of YFe$_{0.03}$Co$_{1.97}$ and YFeCo is studied by means of x-ray diffraction, vibrating sample magnetometry, Mössbauer spectroscopy and AC magnetic susceptibility measurements. All samples crystallize in cubic MgCu$_2$-type phase with lattice constant changing from 7.223 Å for YCo$_2$ to 7.313 Å for YFeCo. Fe atoms are responsible for stabilization of magnetic moments on Co and mictomagnetism is observed in YFe$_{0.03}$Co$_{1.97}$ sample. The Mössbauer spectra permitted distinction between two magnetically inequivalent Fe sites, as reported earlier for YFe$_2$ [2].

References: