

Local magnetic properties of $(RE)_{12}Co_5Bi$ studied by μ SR

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The newly discovered rare earth intermetallic compounds $(RE)_{12}Co_5Bi$ (where RE denotes a rare earth element) give rise to a rich variety of intriguing electrical and magnetic properties [1]. Recent μ SR studies on $(Ho)_{12}Co_5Bi$ revealed that the material undergoes a bulk transition at $T_c=30$ K to a magnetically ordered state and it is shown that in the paramagnetic region, the sample follows a Curie-Weiss law with some slow magnetic fluctuations which persist far above T_c [2]. Considering the fact that magnetic properties in $(RE)_{12}Co_5Bi$ could be dramatically modified by substitution of different RE atoms, it would be interesting to study other members of the series. In order to explore this new generation of scientifically important exotic materials, we apply μ SR to study the local magnetism in polycrystalline samples of series of $(RE)_{12}Co_5Bi$ for different RE. In certain samples, we find clear evidence of a meta-magnetic transition where the magnetic ground state in low applied longitudinal magnetic fields is dramatically different from the one at high fields. In the paper, we will describe and contrast the behavior of selected $(RE)_{12}Co_5Bi$ samples, including discussions of the origin of the meta-magnetic transitions.

[1] Andriy V. Tkachuk and Arthur Mar, *Inorg. Chem.* 44 (2005) 2272.

[2] W.A. MacFarlane et al., *J. Phys Chem. C.* 111 (2007) 5526.