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**Depth Profiles of Exchange Stiffness and Anisotropy in a Spring Magnet with Intermixed Interfaces**<sup>1</sup> YAOHUA LIU, S.G.E. TE VELTHUIS, J.S. JIANG, Y. CHOI, S.D. BADER, Argonne National Laboratory, A.A. PARIZZI, H. AMBAYE, V. LAUTER, Oak Ridge National Laboratory — With complementary studies of Polarized Neutron Reflectometry (PNR) and micromagnetic simulations, we determined the depth profiles of the intrinsic magnetic properties in an Fe/Sm-Co spring magnet with intermixed interfaces, including saturated magnetization, exchange Stiffness and magnetic anisotropy. We found that intermixed region at the Fe/Sm-Co interface is about 8 nm wide, where the magnetic properties change gradually. We compared the results to a model based on a simple mixture of the Fe phase and the Sm-Co phase, as determined from the chemical depth profile using x-ray and neutron reflectivities. In the intermixed region, the saturation magnetization is slightly lower than the value estimated from the model but the exchange stiffness is higher. The magnetic anisotropy is also lower than the expected value from the model. Therefore the intermixed interface yields superior exchange coupling between the Fe and the Sm-Co layers but at the cost of total magnetization.

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