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Controlling MnO spin direction by antiferromagnetic exchange bias in MnO adjoined CoO — •T. BURNUS¹, S. I. CSISZAR², M. W. HAVERKORT¹, T. HIBMA², A. TANAKA³, H.-H. HSIEH⁴, H.-J. LIN⁴, C. T. CHEN⁴, and L. H. TJENG¹ — ¹II. Physikalisches Institut, Universität zu Köln — ²MSC, Rijksuniversiteit Groningen, The Netherlands — ³ADSM, University of Hiroshima, Japan — ⁴NSRRC, Hsinchu, Taiwan

While exchange bias is a well-known phenomenon between ferro- and antiferromagnetic layers, we found evidence for exchange bias between two antiferromagnets. MnO has twenty-four equivalent magnetization axes, leading to randomly orientated domains and thus to vanishing magnetic linear dichroism (MLD) signals when probed with X-ray spectroscopy. So far, attempts to create thin MnO films with preferred domains, utilizing dipolar or single ion anisotropy, has failed; this is evident from the absence of MLD for thin films on Ag or MgO.

We observed magnetic linear dichroism in MnO when using CoO as substrate. That the orientation of the MnO spins is due to the coupling to the Co spins becomes obvious, when MnO is grown on on differently prepared CoO films with easy axes either in or out of plane. In both cases, the spin in MnO is as parallel as possible to the CoO spin direction; the Mn spins do not completely align with the Co spins, however, since MnO keeps its bulk magnetization structure with its preferred {112} domains.

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