

Abstract Submitted  
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**Fabrication and magnetic properties of a magnetite/hematite epitaxial bilayer generated with ion bombardment** O. RODRIGUEZ DE LA FUENTE, S. RUIZ-GOMEZ, I. CARABIAS, A. MASCARAQUE, L. PEREZ, M.A. GONZALEZ, Universidad Complutense de Madrid, A. HERNANDO, Instituto de Magnetismo Aplicado (CSIC-ADIF-UCM), M.A. GARCIA, A. SERRANO, Instituto de Cerámica y Vidrio (CSIC) — The combination of several oxides in the same material may give rise to novel phenomena not displayed by either of the constituent oxides alone. Thus, the improvement or development of methods for the synthesis of heterostructures is mandatory. We present in this work a novel approach to obtain a bilayer formed by a sub-oxide on top of the corresponding oxide: Low Energy Ion Bombardment (LEIB). We have already successfully applied this technique to the TiO(001)/TiO<sub>2</sub>(110) system. Now we show its application in iron oxide thin films: we fabricate a magnetite/hematite (Fe<sub>3</sub>O<sub>4</sub>/α-Fe<sub>2</sub>O<sub>3</sub>) single-crystalline epitaxial bilayer. As far as we know, this system has not been synthesized yet in the form of a thin bilayer. This novel fabrication method involves the transformation of the upper layers of a single-crystalline hematite film to single-crystalline magnetite, a process driven by the preferential sputtering of oxygen atoms. We show the reversibility of the transformation between hematite and magnetite, always keeping the epitaxial and single-crystalline character of the films. The magnetic characterization of the bilayer grown with this method shows that the magnetic response is mainly determined by the magnetite thin film.

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