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A structural, electronic and magnetic study of ultrathin iron oxides M. MONTI, B. SANTOS, J. MARCO, J. DE LA FIGUERA, CSIC-Rocasolano Madrid-SPAIN, M.A. NIÑO, T.O. MENTEŞ, A. LOCATELLI, ELETTRA Trieste-ITALY, K.F. MCCARTY, Sandia Nat Labs Livermore-USA, A. MASCARAQUE, O. RODRÍGUEZ DE LA FUENTE, Complutense Univ Madrid-SPAIN — Iron oxides continue to fascinate us after nearly a century of "modern" science devoted to their growth, properties and structure. Recently, a revival of research has been spurred by the multiferroic character of magnetite, and by its predicted half-metal character, both interesting for spintronic applications. Maghemite is, on the other hand, an interesting counterpart to magnetite. They both present the same inverse spinel structure but maghemite is a ferrimagnetic insulator. In this work we individually characterize flat triangular islands, less than 10 atomic layers thick, of magnetite and maghemite on Ru(0001) by means of selected-area X-ray photoemission and absorption, X-ray circular dichroism and low-energy electron diffraction and reflectivity. We grow magnetite islands in-situ, with well-defined magnetic domains inside, surrounded by a wüstite wetting layer by depositing iron in a molecular oxygen background pressure. Further exposure to NO_2 transforms the magnetite islands into maghemite, while changing the wüstite wetting layer into hematite.

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