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Magnetical studies on thin films of iron oxides JAIME OSORIO, JUAN URIBE, CESAR BARRERO, DORIS GIRATA, ALVARO MORALES, Universidad de Antioquia, AXEL HOFFMANN, Argonne National Laboratory, RAMON GANCEDO, CSIC, ESTADO SOLIDO TEAM, MATERIALS SCIENCE DIVISION TEAM, INSTITUTO ROCASOLANO TEAM — We have grown hematite (α -Fe₂O₃) thin films on stainless steel and silicon dioxide (SiO₂) substrates and magnetite (Fe₃O₄) thin films on silicon substrates by RF magnetron sputtering process. Conversion Electron Mössbauer (CEM) spectra of these films exhibit hyperfine parameter values which are characteristic of these iron oxides. Magnetization measurements parallel to the plane of the film as a function of temperature, M(T), were done at a constant field of 1 kOe to α -Fe₂O₃ films and at 200 Oe to Fe₃O₄ films. The M(T) curve of the α -Fe₂O₃ film showed a linear increasing of magnetization from 5 K to 160 K, related with the Morin transition. While the temperature of the Fe₃O₄ film is decreased, a sharp decrease in magnetization is observed at 123 K, associated to the Verwey transition. We carried out measurements of magnetization as a function of applied magnetic field, the loops of α -Fe₂O₃ film exhibits hysteresis which is related to their weakly ferromagnetic behavior and the loops of the Fe₃O₄ film at 300 and 110 K show a magnetic value around 5 memu at 3 KOe in the curves.

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