Abstract Submitted
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Magnetism in Iron-Titanium Oxide Nanostructures[1] PEGAH HOSSEINPOUR, Chemical Engineering Department, Northeastern University, EUGEN PANAITESCU, Physics Department, Northeastern University, LAURA H. LEWIS, Chemical Engineering Department, Northeastern University, LATIKA MENON, DON HEIMAN, Physics Department, Northeastern University — Modification of the titania nanotubes with magnetic transition metal additions is anticipated to provide the opportunity of creating a novel multifunctional nanostructured material with magnetic, semiconducting and catalytic properties. Incorporation of Fe into titania to produce ordered arrays of amorphous (Fe+Ti)O_2 nanotubes was achieved by electrochemical anodization. As-made nanotubes were subjected to a systematic thermal treatment in a variety of atmospheres for crystallization; their associated morphological, structural and magnetic character was examined. Preliminary results indicate that the Fe-modified nanotubes possess a unit cell volume that is slightly larger than that of titania (137 *vs* 136 Å^3) confirming Fe incorporation into the lattice. The temperature-dependent magnetic susceptibility data obtained from the samples may be decomposed into a Curie-Weiss component that represents the localized magnetic character of titania nanotubes and a Pauli paramagnetic component that represents the semiconducting behavior of the nanotubes. It is noted that Fe incorporation causes an increase in both components of the magnetic signal, suggesting modification of the electronic structure of the crystalline titania phase with iron incorporation.

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