Abstract Submitted
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Mossbauer investigation of scandium oxide-hematite nanoparticles MARK ALLWES, MONICA SORESCU, Duquesne University — Scandium oxide-doped hematite, xSc2O3*(1-x)alpha-Fe2O3 with molar concentration x=0.1, 0.3, and 0.5 was prepared by using ball milling, taking samples at times 0, 2, 4, 8, and 12 hours. The resulting Mossbauer spectra of the nanoparticles systems were parameterized using NORMOS-90. For each concentration, the spectra at 0 hours only consisted of 1 sextet, as the substitution of Sc2O3 into Fe2O3 did not appear until after 2 hours of ball milling time (BMT). Concentration x=0.1 at BMT 2hours consisted of 2 sextets while x=0.3 and 0.5 were fit with 1 sextet and 1 quadrupole-split doublet. Concentration x=0.1 at BMT 4 and 8 hours consisted of 3 sextets, and at BMT 12 hours consisted of 4 sextets. For concentrations x=0.3 and 0.5 at BMT 4, 8, and 12 hours the spectra were fit with 3 sextets and 1 quadrupole-split doublet. With increasing initial concentration, the appearance of the quadrupole-split doublet became more pronounced, indicating the substitution of Fe into Sc2O3 occurred. But for x=0.1, the BMT did influence the number of sextets needed, causing an increase in substitution of Sc2O3 into Fe2O3.

Mark Allwes
Duquesne University

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