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Mossbauer investigation of iridium oxide-hematite nanoparticles JULIA LIMONGELLI, MONICA SORESCU, Duquesne University — Iridium oxide-doped hematite, xIrO_2*(1-x)α-Fe_2O_3 with concentration x=0.1, 0.3, and 0.5, were prepared using ball milling with samples taken at times 0, 2, 4, 8, and 12 hours. The resulting Mössbauer spectra of the nanoparticles systems were parameterized using NORMOS-90. For each concentration, the spectra for 0 hours consisted of one sextet because the substitution of IrO_2 into Fe_2O_3 did not appear until 2 hours ball milling time (BMT). For x=0.1 and 0.3 and BMT 2 hours, the spectra were fit with three sextets. The remaining spectra in x=0.1 and 0.3 were each fit with four sextets. For concentration x=0.5, each spectra from BMT 2-12 hours was fit with four sextets and one quadrupole-split doublet. With increasing initial concentration, the appearance of the quadrupole-split doublet also increased, indicating that the reverse substitution of Fe into IrO_2 also occurred. Increased BMT did not influence the profusion of quadrupole-split doublets, however it did affect the number of sextets; as the BMT increased per concentration, the number of sextets also increased. This shows that increasing the initial concentration causes an increase in the amount of IrO_2 that is substituted into Fe_2O_3.

Julia Limongelli
Duquesne University

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