

Abstract Submitted  
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**Preparation and Characterization of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> Nanoparticles by a Solution-Phase Auto-Combustion Method** MARC DOYLE, Drexel University, MICHAEL LATTANZI, BRIAN KELLY, KARL UNRUH, University of Delaware — The effects of the reaction conditions on the structural and magnetic properties of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles prepared from the combustion products of Fe(III)-nitrate/citric acid/NaOH solutions have been systematically studied in order to gain insights that might be useful in the preparation of more complex oxides from other solution-phase auto-combustion precursors. This work has focused on the effects of the initial solution pH and fuel/oxidant ratio. In particular, precursor powders have been prepared from solutions with pH values between 1 and 12 and with fuel/oxidant ratios between 0.5 and 1.5. Increasing the solution pH and/or the fuel/oxidant ratio lead to significantly less dense and more porous precursor powders due to the greater amount of gaseous reaction products produced under these conditions. X-ray diffraction measurements indicated that under these reaction conditions a higher annealing temperature was required to obtain a phase pure  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> product.

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