

Abstract Submitted  
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**Magnetic properties of cobalt particles produced by thermite reaction.**<sup>1</sup> GAMAGE DANNANGODA, MKHITAR HOBOSYAN, University of Texas Rio Grande Valley, LONG CHANG, DMITRI LITVINOV, University of Houston, KAREN MARTIROSYAN, University of Texas Rio Grande Valley, DEPARTMENT OF PHYSICS, UNIVERSITY OF TEXAS RIO GRANDE VALLEY TEAM, MATERIALS SCIENCE ENGINEERING AND ELECTRICAL COMPUTER ENGINEERING, UNIVERSITY OF HOUSTON TEAM — Thermite reaction composed of active metal (Al, Mg) and metal oxides (e.g. Fe<sub>3</sub>O<sub>4</sub>, MnO<sub>2</sub>, CuO, Co<sub>3</sub>O<sub>4</sub>) that can be used to receive various metal particles such as Fe, Mn, Cu, Co etc. By igniting the solid reactant mixture, exothermic reaction wave propagates through the mixture by converting it to desired product. In this study, we demonstrate the synthesis of cobalt spherical magnetic micro particles produced by cobalt oxide (Co<sub>3</sub>O<sub>4</sub>) and aluminum (Al) reaction. Thermodynamic calculations were performed by using thermochemical Codes HSC-7 and Thermo. Average particle size of 50 nm Co<sub>3</sub>O<sub>4</sub> and 40 nm Al were mixed together according to the stoichiometry in isopropanol solution utilizing self-assembly technique by adding poly-4-vinylpyridine (P4VP). After drying the sample at 60 C for 12 hours, mixture was prepared for ignition. Mixture was ignited into high-pressure cylindrical reactor and pressure release was recorded. XRD, SEM and magnetic properties were determined for the final product. Saturation magnetization about 150 emu/g, was measured using hysteresis measurement, which suggests that final product, is mostly composed of highly magnetic cobalt particles.

<sup>1</sup>Magnetic properties of cobalt particles produced by thermite reaction

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