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Magnetic properties of ball milled Mn nanoparticles JOHN GRIFFIS, SANJAY MISHRA, University of Memphis, M. KHAN, N. ALI, Southern Illinois University, G. MARASINGH, University of North Dakota (Grand Forks), UNIVERSITY OF MEMPHIS TEAM, SOUTHERN ILLINOIS UNIVERSITY COLLABORATION, UNIVERSITY OF NORTH DAKOTA COLLABORATION — Here in we report detail structural and magnetic properties of antiferromagnetic Mn nanoparticles prepared via mechanical ball milling. The surface defects in particle are induced by reducing the particle size and strain induced by ball milling. The x-ray diffraction measurement along with DSC suggests presence of Mn3O4 phase in the sample, a ferrimagnetic phase which increases with the milling time. Upon ball milling a decrease in the Curie temperature of Mn3O4 phase (Tc 42K) to a value Tc 35 K has been observed. A large coercive field at 25K and shifted hysteresis loops along the field and magnetization direction clearly indicates that the overall magnetic properties of the system are governed by surface defects on the particles.

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