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Magnetic Properties of $Fe_{1-x}Pt_x$ Nanoparticles Embedded in Sapphire[1] K.D. SORGE, University of Tennessee, J.R. THOMPSON, Oak Ridge National Lab and University of Tennessee, A. MELDRUM, University of Alberta, C.W. WHITE, S.P. WITHROW, J.D. BUDAI, L.A. BOATNER, Oak Ridge National Lab — A series of materials with $Fe_{1-x}Pt_x$ nanoparticles, embedded in sapphire, has been investigated. The materials were formed by implanting 1×10^{17} Fe-ions/cm^2 into single crystal Al_2O_3, followed by an appropriate overlapping fluence of Pt-ions to obtain compositions $x \approx 0.15$–0.53. Annealing in forming gas at 1100 °C produced electrically isolated nanoparticles with sizes in the range 10–30 nm. Their composition, structure and morphology were investigated by RBS, X-ray diffraction (XRD) and transmission electron microscopy (TEM). The magnetic properties were investigated by SQUID magnetometry in magnetic field H to 6.7 T (applied either parallel or perpendicular to the surface), for temperatures $T = 5$–400 K. The materials were quite hysteretic with maximum coercive fields H_c in the range 2.3–0.8 T for $x \approx 0.45$–0.53. The coercivity H_c decreased relatively little with T in the range studied, even though the saturation magnetization M_{sat} decreased significantly.

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[X] Prefer Oral Session
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