

Abstract Submitted
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Preparation and Characterization of Fe and Fe-Ni Perm Alloy Magnetic Nanoparticles embedded in a Thin Polymer Films¹ T. KEHL, B. ROBERTSON, C. VERA, L. FADIGA, K. PAUL, T. KASSIM, K. GHOSH, R. PATEL, M. CURRY, R. GIEDD, Dept. of PAM & CASE, SMSU, Springfield, MO, S. MISHRA, Physics Dept., University of Memphis, TN, GHOSH TEAM, MISHRA TEAM — The nanoparticles of Fe and Fe-Ni Perm Alloy were prepared via bombarding high energy nitrogen ions with dose of 1×10^{16} ion cm^{-2} at room temperature on a polymer poly ether ether ketone (PEEK) sheet pre-deposited with different thickness (20 to 100 Å) of magnetic thin film. The microstructure of nanoparticles was studied by scanning electron microscope, transmission electron microscope, and magnetic force microscopy. The structural evaluation of the composite via TEM suggests the presence of very fine nanoparticles in the range of 10-20 nm embedded in polymer matrix. Room temperature magneto-transport measurement indicates negative magnetoresistance and the value of MR depends on the size of the nanoparticles. Hall magnetometry shows that as the particle size decreases the behavior of the sample changes from ferromagnetic to superparamagnetic. In this presentation many of unique electrical and magnetic properties of magnetic nanocomposite thin films produced by ion implantation will be discussed in detail.

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