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Effect of Swift Heavy Ion Irradiation on Structural, Morphological and Magnetic Properties of $Prfe_{1-x}Mn_xo_3$ ($X \leq 0.5$) Thin Films

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Abstract—*Present study reports the role of defects caused by swift heavy ion (SHI) irradiation on the structural, morphological and magnetic properties of $PrFe_{1-x}Mn_xO_3$ (x=0, 0.1, 0.3, 0.5) thin films grown on Si (100). Defects created by high energy 120 MeV Ag^{9+} irradiation with a fluence of 5 x 10^{12}ions/cm^2 results in the decrease in the crystallinity and increase in strain in the synthesized films. Effect of SHI on the morphology of the films was studied and it was observed that the surface roughness increased after irradiation. From the magnetic study, we observed that the magnetic properties of system under investigation get enhanced after irradiation. Appearance of peaks in the ZFC curves after irradiation was attributed to the blocking mechanism. Ferromagnetic character was seen to develop in all the films at room temperature after irradiation. The observed modifications are explained on the basis of structural strain and disorder induced by swift heavy ions, which lead to modification of the interionic Coulomb potential at octahedral sublattices and bandwidth in this system.*

Keywords: *A. Ceramics; B. chemical synthesis; D. dielectric properties.*

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