

Abstract Submitted
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Dilute Magnetic and Electronic Properties of $\text{Mn}_x\text{Sc}_{(1-x)}\text{N}/\text{ScN}(001)/\text{MgO}(001)$ Films Grown by Molecular Beam Epitaxy COSTEL CONSTANTIN, Seton Hall University, KANGKANG WANG, ABHIJIT CHINCHORE, ARTHUR SMITH, Ohio University, HAN-JONG CHIA, JOHN MARKERT, University of Texas at Austin — In this study, we report the magnetic and electronic properties of $\text{Mn}_x\text{Sc}_{(1-x)}\text{N}$ films grown by molecular beam epitaxy. Recently, theoretical calculations predicted a Curie temperature above 350 K for ScN films with up to 20% Mn impurity concentrations[1]. The magnetic hysteresis data suggests ferromagnetic behavior for $\text{Mn}_{0.03}\text{Sc}_{0.97}\text{N}$ and $\text{Mn}_{0.15}\text{Sc}_{0.85}\text{N}$ films with Curie temperatures of 383 K and 361 K, respectively. Furthermore, the measured electron concentrations for the $\text{Mn}_{0.03}\text{Sc}_{0.97}\text{N}$ and $\text{Mn}_{0.15}\text{Sc}_{0.85}\text{N}$ films are $6.51 \times 10^{19} \text{ cm}^{-3}$ and $6.17 \times 10^{19} \text{ cm}^{-3}$, respectively. These measured carrier concentration agree well with the prediction of Herwadkar *et al.* that ferromagnetism above room temperature in $\text{Mn}_x\text{Sc}_{(1-x)}\text{N}$ should be possible by keeping the electron concentration below 10^{20} cm^{-3} . This work is supported by: Seton Hall: University Research Council; Ohio University: DOE-BES Grant No. DE-FG02-06ER46317 and NSF Grant No. 0730257; and UT Austin: NSF Grant Nos. DMR-0605828 and DGE-0549417, Welch Foundation Grant No. F-1191. [1] A. Herwadkar (*et al.*), *Phys. Rev. B* **77**, 134433 (2008).

Costel Constantin
Seton Hall University

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