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MnScN(001)/MgO(001) films grown by molecular beam epitaxy: a possible dilute magnetic semiconductor. ARTHUR R. SMITH, Ohio University, COSTEL CONSTANTIN, Seton Hall University, UTKUR MIRSAIDOV, University of Illinois at Urbana Champagne, JOHN MARKERT, University of Texas at Austin — Considerable interest has been of late in finding a room temperature dilute magnetic semiconductor. Recently, theoretical calculations had predicted Curie temperature to be above 400 K for the films with 3% Mn concentration into the $Mn_xSc_{(1-x)}N$ system[1]. In this study, $Mn_xSc_{(1-x)}N$ films (with x = 3-5%) were grown on ScN(001)/MgO(001) substrates by radio frequency plasma assisted molecular beam epitaxy. The buffer layer of ScN(001) was grown on top of MgO(001) at $T_S \sim 800\ ^{\circ}C$ and with a thickness of $\sim$ 50 nm. The MnScN film was grown at $T_s \sim 520\ ^{\circ}C$ and with a thickness of $\sim$ 290 nm. Post-growth x-ray diffraction measurements show that $Mn_xSc_{(1-x)}N$ alloys follow the Vegard's law. The hysteresis magnetic data measured with the superconducting quantum interference device show possible ferromagnetic behavior for the $Mn_{0.03}Sc_{0.97}N$ films with a Curie temperature of $\sim$50 K, but additional data is needed to establish the conclusiveness of the results. Work supported by NSF.

[1]Aditi Herwadkar and Walter R. L. Lambrecht, Phys. Rev. B **72**, 235207 (2005).

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