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Ferromagnetism and n-type conductivity in $Zn_{1-x}Fe_xO$ S. KOLESNIK, B. DABROWSKI, O. CHMAISSEM, Department of Physics, Northern Illinois University, DeKalb, IL, W. L. LIM, Department of Physics, University of Notre Dame, Notre Dame, IN, M. PEKALA, Department of Chemistry, Warsaw University, Warsaw, Poland — Room temperature ferromagnetism in $Zn_{1-x}Fe_xO$ can be obtained by precipitation of $ZnFe_2O_4$ impurity phase (with the Curie temperature of 440 K) after low-oxygen-pressure synthesis.* This impurity can be controlled by changing the synthesis temperature, which makes this material promising for spintronic applications. We have studied this material by magnetic, transport and thermoelectric experiments. The electrical resistivity shows a semiconducting behavior with $\rho \sim 0.4$ Ωcm at 300 K, much lower than Mn- and Co-substituted ZnO. Hall effect measurements show n-type conductivity with mobility $\sim$1-10 cm^2/Vs. The n-type conductivity is independent of the presence of ferromagnetic impurities. A high negative Seebeck (-300 μV/K at 300 K) would make this material suitable for thermoelectric applications if its resistivity could be further reduced. *S. Kolesnik et al., J. Appl. Phys. **95**, 2582 (2004). Supported by NSF (DMR-0302617) and the U.S. Department of Education.

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