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Electrical Spin injection from Fe into ZnSe. AUBREY HANBICKI, G. KIOSEOGLU, M.A. HOLUB, O.M.J. VAN 'T ERVE, B.T. JONKER, Naval Research Laboratory — The wide bandgap semiconductor ZnSe is an opto-electronic material with a comparable spin lifetime and small lattice mismatch to GaAs. Novel spintronic devices that incorporate ZnSe/GaAs heterostructures will require the facile transport of spin information across several heterointerfaces including spin injection into the ZnSe. We have electrically injected spin-polarized electrons from a ferromagnetic Fe contact into a ZnSe epilayer grown on a GaAs heterostructure. The injected carriers proceed through 300 nm of ZnSe and recombine in the GaAs emitting light characteristic of the bulk GaAs exciton. We measure spin polarizations in excess of 40% in the GaAs based on analysis of the circular polarization of the electroluminescence. We report results as a function of applied magnetic field, device current and temperature. The spin injection process and transport through the ZnSe layer sustains significant spin populations in this heterostructure. This work was supported by core programs at NRL.

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