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Ferromagnetic proximity polarization in magnetite/GaAs YAN LI, A. SWARTZ, K. PI, Department of Physics and Astronomy, UC Riverside, W. HAN, J. J. I. WONG, K. M. MCCREARY, Department of Physics and Astronomy, UC Riverside, S. MACK, D. D. AWSCHALOM, Center for Spintronics and Quantum Computation, UC Santa Barbara, R. K. KAWAKAMI, Department of Physics and Astronomy, UC Riverside — Magnetite is an attractive material for spintronics because of its half metallic property and a very high Curie temperature. However, it is not easy to get stoichiometric magnetite films with high quality interface, namely no mixture of other oxides and boundary phases. One limitation is that there are sparse tools for characterizing the interface. We probe the interface of magnetite/GaAs by spin sensitive method, ferromagnetic proximity polarization (FPP), and study the growth condition for best spin filtering effect of the interface. The magnetite film is grown by molecular beam epitaxy, post oxidation of epitaxial Fe film on GaAs. We observed that the electron spins generated by the FPP process are antiparallel to the magnetization of magnetite in magnetite/GaAs, which is opposite to that of Fe/GaAs. This is consistent with the fact that magnetite has fully negative spin polarization at the Fermi level. Detailed study on how the spin dependent performance the interface changes with the growth conditions, e.g. temperature, oxidation time, will be discussed. Supported by NSF and ONR.

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