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Magneto-transport properties of $MnGeP_2$ ferromagnetic semiconductor

Jeongyong Choi[1]*, Young-Hun Hwang[1], Sungyoul Choi[2], Soon Cheol Hong[1], and Sunglae Cho[1,3]
[1]Department of Physics, University of Ulsan
[2]Electronics and Telecommunications Research Institute
[3]Nanodevice Research Center, Korea Institute of Science and Technology

The research for promising ferromagnetic semiconducting materials, with high magneitc moments and high Curie temperatures (T_C), is of the utmost importance spin-dependent electronic devices. We have synthesized a new semiconductor, $MnGeP_2$, whose crystal structure is chalcopyrites, which are "genealogically" related to the more familiar tetrahedrally-coordinated zinc-blende materials. $MnGeP_2$ exhibited ferromagnetism with T_C = 320 K and amagnetic moment per Mn at 5K of 2.58 μ_B, comparable to the calculated 3.2 μ_B. The calculated electronic structure using the full-potential linearized augmented plane wave (FLAPW) method shows an indirect energy gap of 0.24eV. In this talk we will present the magneto-transport properties such as magnetoresistance and Hall resistance of $MnGeP_2$ thin film grown on GaAs(100) using molecular beam epitaxy. The temperature dependent resistance results strongly support the presence of ferromagnetic phase transition around 320 K. On the other hand, we observe an anomalous Hall effectin p-type ($\sim 10^{20}$ cm^{-3}) $MnGeP_2$thin film, indicating the presence of spin polarized hole carriers in $MnGeP_2$, which may be useful for the spintronic devices.