Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Electrical Spin Injection into Two Dimensional Electron Gas.[1]
JONGHWA EOM, Department of Physics, Sejong University, Korea, HYUN CHEOL KOO, DONGHWA JUNG, HYUNJUNG YI, JOONYEON CHANG, JAE BEOM KO, SUK-HEE HAN, Nano Device Research Center, Korea Institute of Science and Technology, Korea — While electrical spin injection has been observed in a variety of metal films, the signal of the electrical spin injection into semiconductors has been hardly observed. We have overcome the difficulties of spin injection by developing a well-controlled interface treatment between the ferromagnetic films and the InAs semiconductor surface. We have found the evidence of electrical spin injection and accumulation in permalloy(Py)/InAs 2DEG/permalloy(Py) lateral devices. Ferromagnetic metal electrodes with different aspect ratio being separated by various separations were fabricated on top of the InAs 2DEG channels. Our multi-terminal geometry allows us to measure non-local spin valve effect as well as local spin valve effect. In the non-local spin valve measurement, we were able to completely isolate the spin valve signal from other spurious effects and observed clear spin accumulation signals. Based on the spin accumulation signal depending on the channel length, we have evaluated the spin relaxation length in the InAs based 2DEG.

[1]This work was supported by the KIST Vision 21 program, the SRC program of MOST/KOSEF, and the Korea Research Foundation Grant (KRF-2003-015-C00224)

Jonghwa Eom
Department of Physics, Sejong University, Korea

Date submitted: 25 Nov 2005 Electronic form version 1.4