Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Proximity Effect in Nb/Mg/CoFe Trilayers. SEONG KOOK CHOI, JUN HYUNG KWON, KOOKRIN CHAR, Seoul National University — We have fabricated the Nb/Mg bilayer and Nb/Mg/CoFe trilayer samples by varying Mg layer thickness and measured their superconducting transition temperature T_c electrically using the 4-prove method. Mg normal layer was used to investigate the effect of its small atomic number, since we have observed previously the largely different behavior when Au, Cu and Al were used. When the Al layer was used, a very unusual behavior was found. Because of chemical interaction between Nb and Mg, the T_c transition curves did not show sharp T_c transition. In order to prevent this interaction, we inserted 2 nm thick Al layer between Nb and Mg. In the case of Nb/Al(2nm)/Mg, we observed T_c behavior consistent with a conventional SN theory. In the case of Nb/Al(2nm)/Mg/CoFe with fixed thicknesses of Nb and CoFe layer, the T_c values exhibited two distinct behavior as the thickness of Mg increased. The T_c value of S/N/F trialyer increased rapidly until the Mg thickness reached a few nm. As Mg thickness increased further to 200 nm, the T_c value of S/N/F decreased again, following closely those of the S/N data. Overall, the Mg data basically followed those of Al data, suggesting that the low atomic number of the normal layer is important in observing the unusual proximity effect in SNF trilayers. Our analysis of the interface effect using an Usadel picture will be presented.

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Date submitted: 20 Nov 2006 Electronic form version 1.4