

Electroresistance and Magnetoresistance Effect in Lead based Oxide thin Films

추성민*, 이규준, 박성민, 조영훈¹, 박광서, 이성익, 정명화
서강대학교 물리학과, ¹한국기초과학연구소 나노물성팀

Recently giant magnetoresistance (MR) and colossal electroresistance (ER) was discovered in a new class of lead based oxide thin films. The two phenomena can be explained by its peculiar spin gapless band structure. In order to verify the differences between the Co doped PbPdO₂ and pure PbPdO₂ we deposited the two materials with a pulsed laser deposition method and measured its properties, including the ER and MR. For PbPdO₂ the properties of the films appeared to be similar to the bulk, where there was no ER measured. On the other hand, for the Co doped system the properties differed from those of the bulk but still no ER effect was detected. The magnetization data indicates ferromagnetic ordering at low temperatures for both materials. The MR data show negative slope in the low field regime, which is due to weak localization, followed by a positive slope with the quadratic form at high fields. In the Co doped system in addition to the negative slope there is a positive slope near the zero field, which is due to weak antilocalization. The MR and magnetization data of the two materials showed evidence of strong spin orbit coupling.