

Room temperature ferromagnetism of Fe doped NiO films prepared by MOCVD

Kyung-Chul Min^{1,2}, Won Mook Chae¹, Sun Sook Lee¹, Young Kuk Lee¹, Taek-Mo Chung¹,
Chang Gyoung Kim¹, Nam-Soo Lee², Yongmin Kim³, Ki-Seok An¹

¹Device Materials Research Center, Korea Research Institute of Chemical Technology

²Department of Chemistry, Chungbuk National University

³Department of Applied Physics, Dankook University

Transition metal (TM)-doped semiconductor (e.g., ZnO, TiO₂, SnO, etc) have attracted much attention with their potential application for the spintronics. Since room temperature ferromagnetic (FM) properties of Mn doped ZnO were predicted, many researchers have intensively investigated FM properties of TM-doped ZnO-based semiconductor. However, few TM doped p-type semiconductor have been reported. Nickel monoxide (NiO) is known as an antiferromagnetic p-type semiconductor at room temperature. It is susceptible to prepare TM-doped p-type semiconductor using NiO.

In this study, we investigated room temperature ferromagnetic properties of Fe doped NiO thin films on SiO₂ and sapphire substrates depending on Fe atomic ratio prepared by low-pressure metal-organic chemical vapor deposition (LP-MOCVD). The deposited films were characterized depending on the Fe atomic ratio. The magnetic properties of deposited films were also investigated.