In this work, Ag-doped and Al-doped ZnO nanorods were prepared by hydrothermal growth on a silicon substrate. First, a seeding layer was formed on silicon substrate by spin coating with a mixed solution of 0.02M zinc acetate (Zn(CH3COO)2∙2H2O) and 1M ethanolamine (NH2CH2OH) dissolved in 20 ml of methanol (CH3OH). Subsequently, the growth of ZnO nanorods was carried out at 90˚C for two hours in the mixed solutions of 0.02M hexamethylenetetramine (C6H12N4), 0.02M zinc nitrate hexahydrate (Zn(NO3)2‧6H2O). In the growth of ZnO nanorods, silver nitrate (AgNO3) for Ag doping and aluminum nitrate (Al(NO3)3∙9H2O) for Al doping was added in the mixed solution, respectively. The AgNO3 and Al(NO3)3 doping levels were 0.1%, 0.2%, 0.4%, 1.0%, 2.0% and 4.0%. The surface morphology of Ag-doped and Al-doped ZnO was observed by field-emission scanning electron microscope (FE-SEM), and their chemical composition was determined from energy diffraction spectroscopy (EDS). Besides, conductivity type, carrier mobility, and carrier concentration was determined by Hall effect measurement.

Keywords: doping, zinc oxide, nanorods

REFERENCES