DOPING EFFECT IN ZINC OXIDE NANORODS FILM

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ABSTRACT

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