Materials Letters 119(2014)71–74

Enhanced exciton emission from ZnO nano-phosphor induced by Yb^{3+} ions

G.L. Kabongo [a,b,c], G.H.Mhlongo [b,n], B.M.Mothudi [a], K.T.Hillie [b,d], H.C. Swart [d], M.S.Dhlamini [a,b,nn]

[a] Department ofPhysics,UniversityofSouthAfrica,POBox392,0003SouthAfrica

[b] CSIR-National CentreforNano-StructuredMaterials,POBox395,Pretoria,0001SouthAfrica

[c] Département dePhysique,UniversitéPédagogiqueNationale,8815Kinshasa/Ngaliema,RépubliqueDémocratiqueduCongo

[d] Department ofPhysics,UniversityofFreeState,Bloemfontein9300,SouthAfrica

Abstract

In this work, the sol–gel method was used to prepare Ytterbium (Yb^{3+}) doped ZnO nano-phosphors with different concentrations of Yb^{3} ions. Their structural, morphological, photoluminescence, electronic states and the chemical composition analysis were investigated in detail. Both pure and Yb^{3+} doped ZnO were found to have hexagonal wurtzite structure with the particle size in the range of 4–7 nm in diameter. Addition of Yb^{3+} ions into the ZnO host lattice led to enhanced exciton emission from ZnO indicating energy transfer from Yb^{3+} ions to ZnO or a reduction of oxygen related defects.