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**Structural, optical and electronic properties of Co-doped ZnO films synthesized by plasma deposition** ZHAOFENG WU, FENG ZHANG, Yancheng Institute of Technology — $Zn_{1-x}Co_xO$ films were prepared by plasma deposition method. The wurtzite ZnO crystal can be well retained up to a Co composition of 9.5% and doped Co ions substituted into Zn sites of ZnO host lattice. All the samples show high transparency over the wavelengths from 400 to 1000 nm. There are three absorption bands located on 567, 615, and 659 nm in the optical transmittance spectra for Co doped ZnO films, which correspond to the electronic transition of Co 3d orbitals in the oxygen tetrahedron, showing the incorporation of Co into the Zn sites in the wurtzite ZnO host lattice. Photoluminescence (PL) spectra show UV emission at ∼3.45 eV shifts to higher energy side with Co doping, indicating the possibility of band-gap engineering in $Zn_{1-x}Co_xO$ films. By sputtering Ag islands onto Co doped ZnO films, large enhancement in the band gap emission intensity was observed by coupling through localized surface plasmons. These results indicate that the films synthesized in our experiment may be applied to manufacture of high efficiency ultra violet light emitting devices.

Zhaofeng Wu
Princeton Plasma Physics Lab

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