8. CONCLUSIONS

In the current research, undoped and doped ZnO thin films have been prepared by chemical bath deposition (CBD) technique. ZnO / KI composite has also synthesized by solid state reaction route. In K doped thin films, when K (alkali) was doped with ZnO, the optical properties of ZnO thin films strongly varied with the doping element concentrations. The optical transmittance and the optical band gap have drastically changed due to doping. The optical constants such as refractive index, dielectric constant and absorption coefficient reveal that the K doped thin films are suitable for optoelectronics applications. From the luminescence spectrum, effects of K in ZnO lattice site can be understood. So, all the K doped ZnO thin films are the best candidate for optoelectronics and sensor applications.

The co-doped ZnO thin films were developed to improve the optoelectronics and spintronics device applications. The optical band gap of the thin films noticeably is increased due to the Cu (Fe) concentrations. The enhanced magnetic properties such as retentivity and coercivity reveal that (Cu, K) doped ZnO thin films and (Fe, K) doped ZnO thin films are suitable for magneto-optoelectronic (optoelectronic and spintronics) device applications. The present work proves that CBD method is one of the best methods to develop ZnO thin films for optoelectronics and spintronics applications.

ZnO/KI composite was prepared at room temperature by solid state reaction method. The luminescence spectrum indicates that the composites are free from deep-level defects. The conductivity of ZnO was changed from n-type to p-type by KI remarkably. The pure ZnO and 20 % composite has n-type whereas 30 and 40% composite is p-type. So, the present investigation will help to fabricate the p-type devices. The results of ZnO/KI composites, speculates that p-type conductivity in ZnO can be achieved. Through ZnO composites in addition to doping suitable alkali ions to ZnO lattice replace Zn$^{2+}$ ions.
The dissertation gives the high advantages of chemical modification of ZnO in the field of optoelectronics, spintronics and electrical applications. The chemical bath deposition method is proved to be one of the best methods to develop the doped ZnO thin films for optical and magnetic applications.