Properties study of ZnO films prepared by ALD

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二.成果简介：

ZnO and B-doped ZnO(BZO) films were deposited on the glass substrate by atomic layer deposition (ALD) method. The influence of annealing treatment and B-doping on properties of ZnO films was investigated. The results indicated that all samples have hexagonal wurtzite structure with (002) preferential orientation and the film crystallinity is improved with increasing deposition temperature and annealing temperature. The resistivity decrease with the increase of annealing temperature. The incorporation of B increases the electrical properties of the ZnO film.

三. 主要研究内容及创新点：

ZnO thin films and B-doped ZnO(BZO) thin films were prepared by ALD method. The effects of substrate temperature, annealing temperature and doping concentration on the optical and electrical properties of ZnO thin films were investigated. XRD results show that all the films have wurtzite structure. The substrate temperature and annealing temperature will affect the crystallinity, even the preferred orientation. The films prepared by ALD are highly transparent in the visible region with average transmittance over 90%. Both substrate temperature and annealing temperature greatly affect the resistivity of the ZnO films, owning to the defect concentration. The number of defects decreases, leading to a decrease in the number of carriers and a decrease of electron scattering, which leads to an increase in mobility. B-doping does not change the crystal structure of ZnO films, but increases the transmittance, and decreases the resistivity. The results are expected to provide guidance for the subsequent research of ZnO thin films with excellent optical and electrical properties.

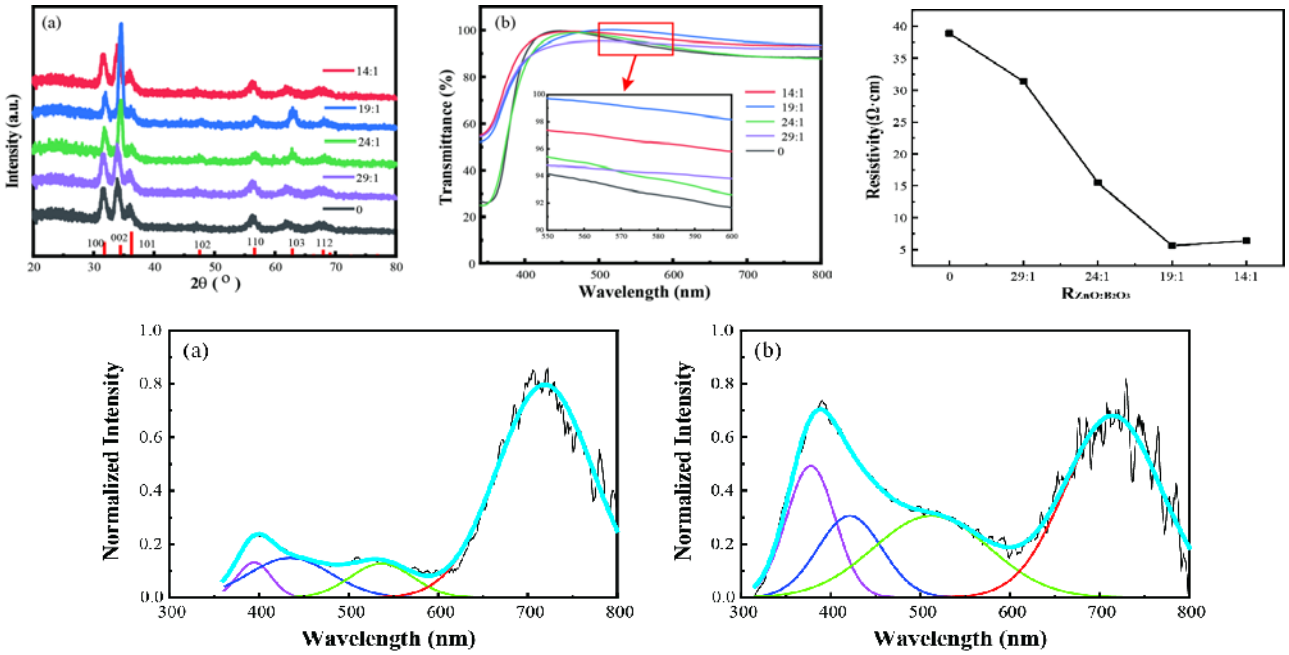


图 1 Microstructure and optoelectronic properties of B-doped ZnO films prepared on the basis of PEALD

四. 主要研究成果及应用情况

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