Study on Al doped zinc oxide films for Transparent Conductive Oxides

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Transparent conducting oxide(TCO) layers consist of degenerate wide band gap semiconductors with high electrical conductivity and transparency in visible range. Undoped and metal doped ZnO films have been widely used in thin film solar cells such as a-Si and $CuInSe_2$ because of their higher thermal stability and good resistance against hydrogen plsma processign damage compared with indium tin oxide (ITO). Zinc oxide have been investigated to several applications such as TCO, photodetectors, and light emitting diodes because it had wide band gap (3.37 eV).

Therefore, We studied a dependency of deposition parameter such as deposition time and RF power, optical and electrical properties of the as-grown Al doped ZnO(AZO) films by XRD, UV, 4-point-probe, etc. As the deposition parameters were changed, the crystalline and the transmittance were changed. The electrical resistivity was also changed with changing deposition parameters. The AZO films have a highly preferred c-axis orientation. As deposition time and RF power was increased, the electrical resistivity was decreased. The optical transmittance of about 80~85% was maintained over the condition.

References

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