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Highly Conductive ZnO Thin Films Deposited Using CVT Ceramics as Magnetron Targets

G. V. Colibaba, D. Rusnac, V. Fedorov, N. Costriucova,
E. V. Monaico, T. Potlog

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Abstract

Sintering of ZnO + Me₂O₃ (Me = Al, Ga, In) powder via chemical vapor transport based on HCl has been developed. The electrical properties of ZnO thin films obtained by DC magnetron sputtering of ZnO ceramic targets have been studied. Transparency, morphology, crystallinity and crystallite size of thin films have also been investigated. ZnO:Ga thin films with a resistivity of $2.5 \times 10^{-4} \Omega \cdot \text{cm}$ have been successfully obtained. The films doped with Al have lower conductivity due to weak sputtering of insoluble Al₂O₃ dielectric inclusions in ceramics. In the case of sintering of ZnO together with In₂O₃, a significant loss of the doping material is observed.

Keywords: thin films, magnetron sputtering, ceramic targets, doping materials

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