

[ZnO-07]

Intentional Hydrogen Doping of Polycrystalline ZnO Thin Film Using Photo-MOCVD Technique

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The effect of hydrogen doping on polycrystalline ZnO thin film prepared by a metalorganic chemical vapor depositont (MOCVD) technique has been investigated. From the increased electrical conductivity and improved electrical stability under air atmosphere [1-2], we speculated that the substitutional complex consisting of an oxygen vacancy and a hydrogen atom as well as interstitial hydrogen located between O-Zn bonds acts as shallow donors [3-4] and decreases oxygen vacancies. Besides the intentional hydrogen incorporation process improves the surface texture.

[Reference]

1. Seung Yeop Myong and Koeng Su Lim, "Highly Stable and Textured Hydrogenated ZnO Thin Films", Applied Physics Letters 82, 3026 (2003).
2. Seung Yeop Myong and Koeng Su Lim, "Improvement of Electrical and Optical Properties of ZnO Thin Films Prepared by MOCVD Using UV Light Irradiation and In-situ H₂ Post-Treatment", Solar Energy Materials and Solar Cells (2004) (게재승인).
3. Chris G. Van de Walle, "Hydrogen as A Cause of Doping in Zinc Oxide", Physical Review Letters 85, 1012 (2000).
4. Chris G. Van de Walle and J. Neugebauer, "Universal Alignment of Hydrogen Levels in Semiconductors, Insulators and Solutions", Nature 423, 626 (2003).