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Optical Characteristics of Oxygen-doped ZnTe Thin Films Deposited by Magnetron Sputtering Method

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ZnTe semiconductor is very attractive a material for optoelectronic devices in the visible green spectral region because of it has direct bandgap of 2.26 eV. The prototypes of ZnTe light emitting diodes (LEDs) have been reported [1], showing that their green emission peak closely matches the most sensitive region of the human eye. The optoelectronic properties of ZnTe:O film allow to expect a large optical gain in the intermediate emission band, which emission band lies about 0.4-0.6 eV below the conduction band of ZnTe [2]. So, the ZnTe system is useful for the production of high-efficiency multi-junction solar cells [2,3].

In this work, the ZnTe:O thin films were deposited on Al2O3 substrates by using the radio frequency magnetron sputtering system. Three sets of samples were prepared using argon and oxygen as the sputtering gas. The deposition chamber was pre-pumped down to a base pressure of 10-7 Torr before introducing gas. The deposition pressure was fixed at 10-3 Torr throughout this work. During the ZnTe deposition, the substrate temperature was 300 oC. The optical properties were also investigated by using the ultraviolte-visible (UV-Vis) spectrophotometer.

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