Growth of ZnBeMgO films by pulsed laser deposition

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— Band gap tailoring of ZnO with Be and Mg co-doping has proven important for the fabrication of a UV detector. For this purpose the deposition of good quality thin films is very essential. We have deposited Zn\(_{1-x-y}\)Be\(_x\)Mg\(_y\)O (x=0, 0.10; y=0, 0.10, 0.20) films on sapphire substrate by pulsed laser deposition. The films were deposited using a KrF excimer laser (\(\lambda = 248\text{nm}\)) with 250 mJ energy and repetition rate of 10Hz at a substrate temperature of 650 °C and O\(_2\) partial pressure 2mTorr. The films were further annealed at 800 °C for 30 min with 200Torr O\(_2\) pressure. X-ray diffraction studies revealed the polycrystalline nature of the films. For the band gap calculation, UV measurements were carried out and a blueshift was noticed. The cutoff wavelength for the pristine ZnO film was 370 nm which decreased to 240 nm for 10%Be and 20%Mg co-doped film. This value of Zn\(_{0.7}\)Be\(_{0.1}\)Mg\(_{0.2}\)O film lies in the solar blind region and should be useful for the fabrication of solar blind UV detector. Other studies like morphological, Raman and I-V characteristics of these films are in process and will be presented in the meeting.

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