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## Surface chemical characterization of ZnO-Eu<sup>3+</sup>/Yb<sup>3+</sup> thin films on Si (100) substrates using TOF-SIMS

*Tuesday, 26 June 2018 15:00 (2 hours)*

Mixed Nitrates of Zn, Eu and Yb were deposited on Si (100) substrates using the sol-gel spin coating method under optimized deposition conditions using monoethanolamine as stabilizing component. This paper reports on the morphology and topographical images of ZnO:Eu<sup>3+</sup>,Yb<sup>3+</sup>(7%) thin films. The surface composition of the annealed ZnO films were investigated by using Field emission Scanning Electron Microscopy (FE-SEM) and Time-of-Flight Secondary Ion Mass Spectroscopy (TOF-SIMS). The presence of various types of particles on the surface of the spin coating thin films as well as the differences in the film structure, played an important role to induce artificial topographical effects on the ZnO:Eu<sup>3+</sup>,Yb<sup>3+</sup> thin films. The presence of H on the surface and throughout the entire thickness of the thin films was confirmed by TOF-SIMS. Furthermore, it was found that the near surface region of the as-grown thin films was Zn-rich, and annealing at higher temperatures (1000 °C) removed the H-related defects from the surface of the thin films and affect the balance of the Zn and O concentrations. Both the positive and negative ion depth profiles of the ZnO:Eu<sup>3+</sup>,Yb<sup>3+</sup>(7%) thin films were measured. The two and three-dimensional (2D and 3D) images have also been recorded in the positive and negative ion mode. Analysis of the 3D images showed big agglomerated particles on the surface of the Si substrate that appears to be embedded in the substrate and the substrate appears to be on the same level as the particles. This phenomenon was due to the artificial topographic effects which are attributed to the experimental setup of the TOF-SIMS system. The details of these features will be discussed.

Key words: Spin coating, Tof-SIMS, 2D and 3D images.

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