**Abstract**

Zinc oxide thin films were deposited on p-Si (111) substrates using cathodic vacuum arc deposition method. During deposition, the substrates were kept at room temperature (RT), 573 and 873 K. The structure, surface morphology, microstructure and composition were determined as a function of substrate temperature using different techniques, viz., X-ray diffraction (XRD), Field emission scanning electron microscopy (FESEM), Raman spectroscopy and Energy Dispersive analysis of X-rays (EDAX). The XRD patterns of the as deposited film showed a strong c-axis orientation with a (002) peak, and the diffraction line intensity increased with substrate temperature with changes in the peak orientation. FESEM image showed an increase in crystallite size with the substrate temperature. The compositions of the films are nearly stoichiometric at elevated temperatures. The Raman results show substantial enhancement and broadening at 437 cm-1 which correlates excellently with the change in width of the X-ray diffraction (002) peaks.