**Abstract**

Zinc Phosphide (Zn3P2) films were deposited by vacuum evaporation under a pressure of 1.3 × 10− 5 m bar onto well-cleaned glass substrates. I–V measurements show Ohmic and non-ohmic behavior for lower and higher fields, respectively. The field-lowering coefficient was calculated theoretically and experimentally and it was found that the possible conduction mechanism in these films is Richardson–Schottky type. The activation energy decreases as the voltage increases. The zero-field activation energy was found to be 0.97 eV and this zero field activation energy decreases with an increase in film thickness. The capacitance measurements were made at room temperature. The flat band potential was found to be ∼ 1.5 V. The ionized charge density and the total number of interface states were calculated and the values were found to be 5.30 × 1016/cm3 and 4.18 × 1017 cm− 2 eV− 1 respectively.