**Abstract**

 Zinc Phosphide films prepared by vacuum evaporation have been studied for their photovoltaic properties. X-ray diffraction studies reveal that the films are crystalline in nature and that the crystallinity improves with increase in film thickness and annealing temperature. Structural parameters such as crystallite size, strain and dislocation density are calculated for both annealed and unannealed films and the results are discussed on the basis of film thickness and temperature. The films are highly absorbing in nature, and the transmittance and absorption seems to be thickness dependent. The band gap energy decreases with increase in film thickness as well as annealing temperature, and the possible transitions in these films are found to be direct and allowed