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| **Abstract:** |  |
| The effect of thickness modifications of zinc oxide (ZnO) thin films and the impressions over the electrical and optical characteristics were analyzed. ZnO thin films were deposited by the sol–gel spin coating method. For measuring the thickness of the films, a surface profilometer was operated. By maintaining an unvarying density of sol–gel (with 2% fabrication tolerance), the thin films were deposited on glass substrates. To identify the changes in optical variables, an ultraviolet–visible (UV–Vis) spectrophotometer was used. With the increment of deposition thickness, a nonlinear difference in skin depth has been observed. The bandgap showed a redshift and was in the range of 3.27–3.25 eV which is suitable for photonic applications. Electrical parameters were defined by ECOPIA Hall effect measurement system. The maximum measured sheet resistance in the current research is 5.43 × 107 (Ω/square) for 200 nm thin film. For 100 nm thickness, high mobility (221 cm2 V−1 s−1) and small resistivity (306.3) (Ω-cm) has been obtained. The above-mentioned high mobility and small resistivity are highly desirable for the transparent electrode of CIS solar cells and buffer layer. | |