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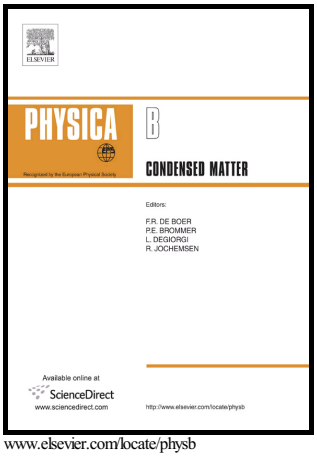


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# Structural, optical and electrical characteristics of nickel oxide thin films synthesised through chemical processing method

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**Abstract**

A simple and cheap chemical deposition method was used to produce a nickel oxide (NiO) thin film on glass substrates from a solution that contained $Ni^{2+}$ and monoethanolamine. Thermal treatment of the film at temperatures above 350 ℃ for 1 h caused decomposition of the nickel hydroxide into nickel oxide. Structural, optical and electrical properties of the film were studied using X-ray diffraction (XRD), spectrophotometry, current-voltage measurements and scanning electron microscopy (SEM). The film was found to be polycrystalline with interplanar spacing of 0.241 nm, 0.208 nm and 0.148 nm for (111), (200) and (220) planes respectively, the lattice constant *a* was found to be 0.417 nm. The film had a porous surface morphology, formed from a network of nanowalls of average thickness of 66.67 nm and 52.00 nm for as-deposited and annealed films respectively. Transmittance of visible light by the as-deposited film was higher and the absorption edge of the film blue-shifted after annealing. The optical band gap of the annealed film was 3.8 eV. Electrical resistivity of the film was 378 Ωm.

**Keywords** Chemical deposition; NiO; Thin film; Polycrystalline, Optical band gap; Electrical resistivity

## 1. Introduction