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# Structural, morphological and optical properties of electron beam evaporated WO<sub>3</sub> thin films

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## Abstract:

Tungsten trioxide (WO<sub>3</sub>) is one of the best transparent metal oxides, which exhibits a wide variety of novel properties, particularly in thin film form, for advanced technological applications. The present investigation is aimed at the morphological and optical properties of WO<sub>3</sub> thin films prepared by electron beam deposition technique in an oxygen partial pressure  $2 \times 10^{-4}$  mbar and at different substrate temperatures. The deposited films at room temperature (RT) are amorphous in nature and enhance the crystallinity by increasing the substrate temperature with noticeable peaks at (320), (210) and (402). The peaks represent the mixed phase of orthorhombic and hexagonal, predominantly orthorhombic phase of WO<sub>3</sub> films. The surface roughness and the grain size are also observed to be increased with the substrate temperature. The optical transmittance and energy band gaps decreased with increasing substrate temperature. The band gap energy values were found to be in the range 3.302 - 3.084 eV for the films deposited at substrate temperatures ranging from RT to 450°C.

**Keywords:** WO<sub>3</sub> thin films, Electron beam evaporation, Structure, Morphology, Optical properties.

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