



## Low Sheet Resistance F-Doped $\text{SnO}_2$ Thin Films Deposited by Novel Spray Pyrolysis Technique

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**Abstract:** Transparent conductive glass (Fluorine-doped tin oxide ( $\text{SnO}_2$ : F or FTO)) thin films were deposited on glass substrates by pulsed spray pyrolysis (PSP) technique at substrate temperature of  $500^\circ\text{C}$  and different fluorine concentrations. Tin metal dissolved in hydrochloric acid used as a precursor of tin and ammonium fluoride ( $\text{NH}_4\text{F}$ ) as a fluorine precursor. X-ray diffraction (XRD) shows that the pure  $\text{SnO}_2$  and fluoride doped films are polycrystalline with a tetragonal crystalline structure. The pure  $\text{SnO}_2$  and fluoride doped films showed 60- 80% of transparency in the visible region depending on the F ratio. FTO deposited films have the lowest sheet resistance for spray technique that is  $2 \Omega / \text{cm}^2$  and highest figure of merit of  $4.7 \times 10^{-3} \text{ cm} \cdot \Omega^{-1}$  at 800 nm. The obtained results indicated that the structures, optical and electrical properties of the films were greatly affected by the fluorine (F) concentration ratio.

**Keywords:** F doped  $\text{SnO}_2$ ; Thin films; Transparent Conductive Oxides (TCOs); Pulsed Spray Pyrolysis (PSP) technique.

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