

# A Copper Oxide (CuO) Thin Films Deposited by Spray Pyrolysis Method

**BELLAL Y<sup>\*1,2</sup>, BOUHANK A<sup>1</sup>, SERRAR H.<sup>1</sup>, Tüken T.<sup>3</sup> and Sığircık G.<sup>3</sup>**

<sup>1</sup>Thin films development and applications unit Setif, Research Center in Industrial Technologies (CRTI) P.O.Box 64, Cheraga 16014 Algiers, Algeria

<sup>2</sup>Department of Engineering Process, Faculty of Technology, Laboratory of Electrochemistry, Molecular Engineering and Redox Catalysis (LEIMCR), Ferhat Abbas University Setif-1, Algeria

<sup>3</sup>Faculty of Science and Letters, Çukurova University, Adana, Turkey

Email: y.bellal@crti.dz/ bellalyoucef@univ-setif.dz.

Tel: +2137.92.69.50.61.

**Abstract.** A simple and low-cost procedure (spray pyrolysis) was used to elaborate copper oxide thin films on ordinary glass substrates. A copper nitrate was used and dissolved in two different solutions (Water, Methanol) S<sub>1</sub> and S<sub>2</sub> respectively in order to obtain an equal concentration; C<sub>S1</sub>, S<sub>2</sub> = 0.5M.

The spray pyrolysis deposition made at fixed temperature T = 500°C and different volumes of S<sub>1</sub> or S<sub>2</sub> on the glass substrates. The X-ray diffraction (XRD), scanning electron microscopy (SEM) and UV-vis spectrophotometry were used to determinate the structural, morphological and optical properties of CuO thin films. The X-ray diffraction patterns confirm the presence of the polycrystalline phase of CuO as monoclinic crystal structure with preferential orientation along (110), (002), (111), (200) and (020). Their optical band gaps ranged from 3.95 to 4.02 eV for thin films made with S<sub>1</sub>, and from 1.6 to 1.95 eV for thin films made with S<sub>2</sub> with a high absorbency in the visible region, which is in agreement with the values of the literature.



**Youcef BELLAL**, phd student, holds a full time position at Research Center in Industrial Technologies (CRTI) P.O.Box 64, Cheraga 16014 Algiers, Algeria. He has been working in thin films research since 2014. His research topics are focused on :

1/Elaboration and characterization of thin films for environmental applications

2/ Study of the inhibitory effectiveness of the Schiff base with respect to the corrosion of concrete reinforcement emerged in an external aggressive medium.