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Investigations on the formation of Copper based films deposited by an atmospheric pressure DC plasma source

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Nanostructured copper oxide in its different forms (CuO, Cu₂O) has physical and chemical properties, which makes it a promising material for various applications, e.g. as a suitable material for gas sensors [1] or for photocatalytic hydrogen production [2]. Especially copper oxide nanoflakes are considered as a material with high potential for its usage in pseudocapacitors [3], which are part of supercapacitors, or as biosensors [4].

In this work we report about the results using an atmospheric pressure plasma source for depositing copper oxide layers [5, 6]. This deposition method has no need of any vacuum system and, thus, can be easily integrated in existing industrial process chains. For the investigation of the non-thermal DC plasma source optical emission spectroscopy has been used aiming at the understanding of Cu vapour formation. The deposited films, showing flake formation, were analyzed by scanning electron microscopy and X-ray photoelectron spectroscopy.

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Keywords

atmospheric pressure plasma

film deposition

Cu oxide nanoflakes