

Carbon nanotubes immobilized copper(salen) nanocomposite for electrochemical oxygen evolution reaction

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Efficient oxygen evolution reaction (OER) electrocatalysts are widely required in the realm of water electrolysis and rechargeable metal-air batteries. This work describes an easy and simple method for the synthesis of copper salen (Cu(Salen))-functionalized multiwalled carbon nanotubes (MWCNTs) nanocomposite materials (Cu(Salen)/MWCNTs). It has been used for OER in the basic medium (0.1 M KOH). The resulting nanocomposite, Cu(Salen)/MWCNTs, has been studied using spectroscopic and microscopic techniques such as Fourier transform infrared (FT-IR), UV-visible spectroscopy, powder X-ray diffraction (p-XRD), scanning electron microscopy (SEM), and energy dispersive X-ray analysis (EDAX). The electrochemical characterization of prepared Cu(Salen)/MWCNTs nanocomposite based modified glassy carbon (GC) electrodes (GC/Cu(Salen)/MWCNTs) and their application towards OER have been performed using an electrochemical method. The Tafel slope of nanocomposite material is 159.6 mV/dec in 0.1 M KOH solution, indicating that GC/Cu(Salen)/MWCNTs could be a promising and cost-effective electrode material for the OER. This study demonstrates a novel way for creating an active nanocomposite catalyst for OER in alkaline media.

Keywords: Copper (salen), MWCNTs, Oxygen evolution reaction, Electrochemical, Nanocomposite, Modified electrode

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