**Zinc zirconate (ZnZrO3) nanocomposites bimetallic designed by green synthesis via *Moringa Olefeira* extract for high-performance electrochemical applications**

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**Abstract**

In this work, we report a simple and eco-friendly method of synthesizing ZnZrO3 nanocomposites by green approach method using Moringa Oleifera natural plant extract that acted as both capping and reducing agent via their photochemical. The proposed mechanism towards the formation of ZnZrO3 nanocomposites in view of understanding the interaction of Zn (II) and Zr (IV) ions through biological compounds of Moringa Oleifera extract was designed from FTIR analysis. The physical and electrochemical properties were characterized using different techniques such as High Resolve Transmission Electron Microscope (HRTEM) Energy Dispersive X-ray Spectroscopy (EDS) X-ray diffraction (XRD) Fourier transform infrared (FT-IR) Cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). The electrochemical analysis clearly revealed redox peaks at around peak potentials of 0.075 (peak III) and - 0.563 V (peak IV) during the cathodic cycle, due to the reduction and around - 0.252 (peak I) and 0.207 (Peak II), corresponding to the oxidation of ZnZrO3 nanocomposites. The excellent electrochemical performances suggest that ZnZrO3 nanocomposites are highly suitable for electrochemical applications due to their good voltammetric response, high electro-activity, and good electrochemical kinetics.

Keywords: Voltammetry, Zinc zirconate, Green chemistry, Moringa Oleifera, Electrochemistry, Pseudo-capacitive