Synthesis and Characterization of Hexagonal Prism like Zinc Oxide for Electrochemical Determination of Gallic Acid in Wine Samples

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Metal oxides have stimulated significant attention due to their potential applications in various technology and applications. In this paper, facile and novel hexagonal prism like zinc oxide (HP-ZnO) has been successfully synthesized by mechanochemical synthesis. As prepared HP-ZnO was characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), Energy-dispersive X-ray spectroscopy (EDS), particle size distribution and ultraviolet visible spectroscopy (UV-vis). Moreover, the electrochemical behavior of the proposed electrode was examined by the cyclic voltammetry and amperometric techniques. The electrochemical sensor exhibited a wide linear range from 0.1 to 130 μM with a trace-level detection of 0.02 μM (S/N=3) and showed good linearity $R^2 = 0.9903$. This excellent electrochemical sensing ability can be attributed to good surface area, electronic conductivity and numerous active sites. The practical application of proposed electrochemical sensor was proved by successful detection of GA in wine samples. The results

indicated that the HP-ZnO is promising electrochemical sensor for selective determination of GA at trace levels in real samples.

Keywords: Metal Oxides, Amperometric Method, Phenolic Compounds, Gallic Acid, Wine Samples.

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