

A Novel Flakes-Like Structure of Molybdenum Disulphide Modified Glassy Carbon Electrode for the Efficient Electrochemical Detection of Dopamine

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In this present study, we have reported a novel and simple hydrothermal approach for synthesis of molybdenum disulphide (MoS₂) flakes. The synthesized material effectively utilized for the fabrication dopamine electrochemical sensor. Moreover, the successful formation of flakes-like MoS₂ was confirmed by X-ray diffraction (XRD), scanning electron microscope (SEM) and energy dispersive X-ray (EDX) studies. The electrochemical characteristics of the flakes-like MoS₂ were studied by using cyclic voltammograms (CVs) and amperometric (*i-t*) techniques. As an electrochemical sensor, the flakes-like MoS₂ modified glassy carbon electrode (GCE) exhibited higher electrocatalytic activity in the oxidation of dopamine in terms of higher oxidation peak current and lower oxidation potential when compared with bare GCE. The flakes-like MoS₂ based electrochemical sensor has been fabricated which detect dopamine in wide linear response range (0.006 - 181 μM), good sensitivity (3.98 μAμM⁻¹cm⁻²) and very low detection limit of 2 nM. Moreover, the flakes-like MoS₂ modified GCE showed good selectivity even in the presence of biologically co-interfering compounds and common metal ions.

Keywords: Flakes-like structure, MoS₂, SEM, Electrochemical sensor, Dopamine

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