Rose-Petal-Like Morphology of Yttrium Molybdate Nanosheets (YMoO₄) Anchored on Functionalized Carbon Nanofibers: An Efficient Electrocatalyst for the Electrochemical Sensing of bisphenol-A

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The current study aims to develop the electrochemical sensor based on the rarely studied metal molybdate. Based on this view, we have developed a novel yttrium molybdate (YMoO₄) nanosheets (NSs) using wet-chemical method. Further, the conductivity of YMoO₄ NSs was improved by integration with functionalized carbon nanofiber (f-CNF) through a simple ultrasonication method. As-prepared YMoO₄ and YMoO₄/f-CNF composite was systematically characterized by various spectroscopic techniques including XRD, RAMAN, and HR-TEM analysis. From the analysis, the successful integration of YMoO₄ with f-CNF was scrutinized. In addition, the electrocatalytic behavior of YMoO₄/f-CNF nanocomposite was investigated by the electrochemical detection of bisphenol-A (BPA) using cyclic voltammetry and differential pulse voltammetry techniques. As we expected, YMoO₄/f-CNF modified glassy carbon electrode (GCE) achieved a low detection limit of 0.01 μM and linear response range of 0.1 - 1318 μM towards the detection of BPA. From the above results clearly, evidenced that the YMoO₄/f-CNF nanocomposite was an efficient electrode material for the determination of BPA in real sample analysis.

Keywords: Metal molybdate, Nanosheets, Yttrium molybdate, Functionalized carbon nanofiber, Electrochemical sensor, Bisphenol-A.

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