Scheelite type Barium Tungstate Nanoparticles Decorated on Graphitic Carbon Nitride Nanocomposite for the Detection of Diphenylamine in Apple juice

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doi: 10.20964/2021.08.13

Received: 2 May 2021 / Accepted: 31 May 2021 / Published: 30 June 2021

Herein, a Barium tungstate (BaWO_4) and Graphitic carbon nitride (GCN) based a new electrochemical sensor ($\text{BaWO}_4/\text{GCN}/\text{GCE}$), for the detection of diphenylamine (DPA). Nearly oval-shaped BaWO_4 was anchored on the GCN sheets by a worthwhile and simple hydrothermal route. Cyclic voltammetry (CV) and Differential pulse voltammetry (DPV) were used to scrutinize the electrochemical performance of DPA on $\text{BaWO}_4/\text{GCN}/\text{GCE}$. The prepared sensor exhibited phenomenal electrocatalytic action towards the detection of DPA. Moreover, the BaWO_4/GCN sensor exhibiting good sensitivity of $1.51267 \mu\text{A} \mu\text{M}^{-1} \text{cm}^{-2}$ with the low detection limit (LOD) of 1 nM and a broader linear range from 0.001 to 533 μM for DPA detection under the improved experimental conditions. Furthermore, the effect of storage duration on the BaWO_4/GCN sensor's CV response reveals the improved stability. Owing to these extraordinary analytical advantages, the as-produced sensor was applied to analyse the DPA level in apple juice with satisfactory results.

Keywords: Diphenylamine, Graphitic carbon nitride, scheelite, electrochemical sensor, cyclic voltammetry.

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