Electrochemical Determination of Paracetamol Using MXene/single-walled Carbon Nanohorns Composite as Sensor

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In this study, single-walled carbon nanohorns (CNHs)-intercalated MXene (Ti₃C₂) (MXene/CNHs) composite was successfully synthesized, which was used as electrochemical sensor for paracetamol (PAR) detection. The composite of MXene/CNHs exhibits excellent conductivity, large specific surface area and superior electrocatalytic properties. Specifically, the embedding of the CNHs into MXene nanosheets successfully prevents the re-stacking of MXene and provides abundant active sites for catalytic PAR oxidation, which can availably improve the current signal of the electrochemical sensor. Under the optimum conditions, the designed MXene/CNHs electrode can be employed to detect PAR in a broad concentration range of 5.0 nM - 10.0 μM with a low limit of detection (LOD) of 2.0 nM (S/N = 3). Additionally, the modified electrode exhibits high selectivity, good reproducibility and acceptable stability.

Keywords: MXene; Single-walled carbon nanohorns; Paracetamol; Electrochemical determination

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