

Highly exposed {001} facets of titanium dioxide modified with reduced graphene oxide for dopamine sensing

Abstract

Titanium dioxide (TiO₂) with highly exposed {001} facets was synthesized through a facile solvo-thermal method and its surface was decorated by using reduced graphene oxide (rGO) sheets. The morphology and chemical composition of the prepared rGO/TiO₂ {001} nanocomposite were examined by using suitable characterization techniques. The rGO/TiO₂ {001} nanocomposite was used to modify glassy carbon electrode (GCE), which showed higher electrocatalytic activity towards the oxidation of dopamine (DA) and ascorbic acid (AA), when compared to unmodified GCE. The differential pulse voltammetric studies revealed good sensitivity and selectivity nature of the rGO/TiO₂ {001} nanocomposite modified GCE for the detection of DA in the presence of AA. The modified GCE exhibited a low electrochemical detection limit of 6 μM over the linear range of 2–60 μM. Overall, this work provides a simple platform for the development of GCE modified with rGO/TiO₂ {001} nanocomposite with highly exposed {001} facets for potential electrochemical sensing applications.

Keyword: Titanium dioxide (TiO₂); Highly exposed {001} facets; Reduced graphene oxide (rGO)