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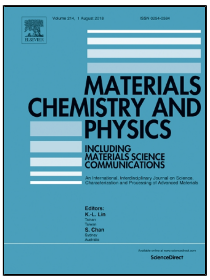

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Surfactant-assisted Titanium dioxide/graphene Composite for Enhanced Conductivity

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Abstract

Titanium dioxide/graphene (TiO_2/G) was synthesized by a simple method through adding cationic surfactant to assist the stabilization of rutile TiO_2 in aqueous solutions and facilitate the electrostatic assembly of binding with surface of graphene. TiO_2/G materials were used for investigation of its conductivity and dispersibility. The TiO_2/G was showed significantly to enhance in conductivity and dispersibility after adding cetyltrimethylammonium bromide (CTAB). The good performance may be attributed to increasing TiO_2 to uniformly distribute on the surface of graphene in the presence of CTAB. The TiO_2/G composite was characterized by Zeta potential, Fourier transformed infrared spectra (IR), X-ray diffraction (XRD), Scanning electron microscopy (SEM) and Electrochemical impedance spectroscopy (EIS), respectively. The CTAB does not affect the crystalline structure of TiO_2 and graphene. When CTAB is 30%wt of TiO_2 and graphene is 7%wt of TiO_2 that the resistivity of TiO_2/G is measured as 2.4 Ω·cm. The dispersion of TiO_2/G can be kept for 24 h without precipitation. EIS showed that the TiO_2/G with 30%wt of CTAB had the lowest electrical resistance, which tended to be consistent with the results of the measured resistivity. The results showed that the best conductivity and dispersibility of the TiO_2/G composite with CTAB in this experiment.

Keywords: Graphene; TiO_2; Conductivity; Dispersibility

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