GRAPHENE/POLYANILINE CORE-SHELL NANOLAYERS PREPARED BY IN SITU INVERSE MICROEMULSION

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Abstract

The combination of carbonaceous nanostructures (like Graphene) and conjugated polymers (as polyaniline) offers the possibility of exploring new materials presenting novel mechanical, electrical, optical and electrochromic properties [1]. The strong interaction in such conjugated systems greatly improves the charge-transfer reaction between polyaniline and the graphene [2].

Composites with core–shell structures consisting of polyaniline and Graphene were prepared via in situ inverse microemulsion of aniline monomers by using Graphene with minimized defects as templates. Influences of the thickness of the polyaniline layer on the surface of graphene on the electrical conductivity property of the resulting composites were discussed.

All the materials were characterized by XRD, FT-IR, and UV-Vis spectroscopy. The formation of polyaniline (PANI) shell layer on the surface of graphene was investigated by transmission electron microscopy (TEM) and scanning electron microscopy (SEM). The thermal stability and electrical conductivity of the Graphene/PANI composites were examined by thermogravimetric analysis (TGA) and conventional four-probe method, respectively. In comparison with the pure PANI, the Graphene/PANI core–shell structures showed enhanced electric conductivity and thermal stability.

Keywords: polyaniline, graphene, core-shell structure, inverse microemulsion.

LITERATURE


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