

عنوان مقاله:

Automotive industry: Using conducting composites as primer coating under the cataphoretic painting

محل انتشار:

چهارمین کنگره بین المللی پوشش های حمل و نقل (سال: 1393)

تعداد صفحات اصل مقاله: 6

نویسنده:

A Goodarzi - HMS, Harvard University, Landmark Center

خلاصه مقاله:

Conductive polymer coatings are mostly considered as one of the most effective anti-corrosion materials, while at the same time are the most environmentally friendly materials. The negatively charged water-soluble long, need like multiwall carbon nanotubes (better known as MWCNT-7) serves as anionic dopant during the electropolymerization to synthesize PPy/MWCNT composite films. The synthetic, morphological and electrical properties of PPy/MWCNT-7 films and polypyrrole (PPy) films were compared. Characterization was performed by cyclic voltammetry and scanning electron microscopy (SEM). SEM images revealed that the incorporation of MWCNT-7 significantly altered the morphology of the PPy. To predict mechanical properties of carbon nanotube composites bonded with multiple multiwall carbon nanotubes, we have used computational method based on molecular dynamics (MD) and molecular mechanics (MM). Therefore, to evaluate the anti-corrosive features of the matrix Polypyrrole (PPy) film, experiments were performed to analyse the performance of PPy and multiwall carbon nano-tubes (MWCNT-7) or Long, tangled (MWCNTLT) reinforced composite coatings. Computational tools were implemented to investigate mechanical properties of PPy/MWCNT-7 and PPy/MWCNTLT composites. Then, using potentiodynamic measurements, transmission electron microscopy (TEM) and scanning electron microscopy (SEM), the obtained films were experimentally assessed as anti-corrosive materials. The SEM/TEM results showed that the MWCNTLT and MWCNT-7 were fully dispersed in the composite coatings, further tests indicated they also have significantly improved mechanical integrity of composites. Furthermore, it was safe to conclude that using composite coating is more capable at anti-corrosion protecting than using pure PPy. Increasing MWCNT content were in parallel of increasing Young's moduli, and values changed from 2.67 GPa (pure PPy) to 4.15–4.61 GPa (PPy/MWCNT-7 composite system).

کلمات کلیدی:

Molecular modelling; Mechanical properties; Corrosion protection

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/336271>

