URN etd-0407109-183706-401
Author Zu-Pei Ou
Author's Email Address No Public.
Statistics This thesis had been viewed 60 times. Download 0 times.
Department
Year 2002
Semester 2
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title Preparation and characterization of conducting polyaniline and its related materials
Date of Defense 0000-00-00
Page Count 114

Keyword
polyaniline
DBSA
Clay
PVA
NMP

Abstract
Electrical conducting polymer/clay nanocomposites have been applied in rechargeable batteries, electromagnetic shielding, anticorrosion coating…. etc. The thesis has been divided into three parts. The first and second parts describe the preparation and characterization of electrical conducting polyaniline/clay nanocomposites prepared by the chemical oxidiation synthesis method. The third and fourth part describes the solution blend preparation and characterization of the emeraldine base (EB) type polyaniline (PANI)/poly (vinyl alcohol) (PVA) and emeraldine salt (ES) type PANI/PVA - dodecyl benzene sulfonic acid (DBSA) blend films.

In the first part, a modified method to prepare the electrical conducting PANDB (polyaniline doped by DBSA)/clay nanocomposites in the presence of DBSA and montmorillonite (MMT) clay with various weight percentages (0.1、0.25、0.5 wt%) is studied. The results of scanning electronic microscopy (SEM) show the surface of PANDB/clay nanocomposites is rougher than that of PANDB. From the X-ray diffraction (XRD) spectra, it shows that the silicate layers of clay are intercalated by the polymerization of aniline monomer.

In the second part, the electrical conducting PANDB/clay nanocomposites are prepared at various reaction temperatures (0℃, 10℃, 20℃, 30℃ and 40℃). The time for the color change of reaction solution is decreased with the reaction temperature increased. The yield of the PANDB/clay nanocomposite is also increased with the reaction temperature increased. The lower the polymerization temperature of PANDB/clay nanocomposite is, the lower the conductivity of the nanocomposite has. The thermogravimetric analyses (TGA) show the thermal degradation onset temperature of the PANDB/clay nanocomposite is decreased with the reaction temperature increased. From the XRD spectra, it shows that the silicate layers of clay are intercalated by the polymerization of aniline monomer.

In the third and fourth part, solution blend method is adopted to prepare the conductive PANDB/PVA films. The EB type PANI is dissolved in N-methyl-2-pyrrolidinone (NMP) and then blended with the PVA solution or the PVA-DBSA solution by different weight ratios. By using the surface resistance meter, it is found that the surface resistance of the blended films is increased as the weight percent of the EB type PANI is decreased. By using the TGA analysis, the thermal degradation onset temperature of the PANI/PVA blend films is decreased with the weight percent of EB type PANI solution increased. On the other hand, the thermal degradation onset temperature of

the PANI/PVA-DBSA blend films is increased with the weight percent of the EB type PANI is increased. The intensity of the functional groups on the blend films is significantly changed if the blend ratio is changed.

Advisory Committee

Cheng-Ho Chen - advisor

Files No Any Full Text File.

Date of Submission 2004-02-11