

Preparation of Colloidal Properties and Water Dispersible Conductive Polypyrrole Nanocomposite of Nanocrystalline Cellulose

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Abstract

The development of conductive polypyrrole (PPY) processability was successfully achieved by a synthesis of colloidal form with high dispersion stability in aqueous medium. In situ polymerization method of pyrrole monomers (PY) assisted by aqueous suspension nanocrystalline cellulose (NCC) and the oxidizing agent ammonium persulfate (APS). Facile and fast technique consisted of deposition of PY monomers on the NCC surface via electrostatic attractions between the sulfate groups in NCC surface and the amine group of the PY. Steric hindrance feature of NCC suspension significantly influences the colloid production. The nanocomposite of PPY and NCC (PPY-NCC), purified by centrifuge repeatedly and desiccated by freeze-dry technique. The observations of scanning electron microscopy (SEM) and transmission electron microscopy (TEM), clearly shows the nanostructure modification for nanocomposite and the NCC particles after the composition. The PPY-NCC nanocomposite have very good dispersion stability in aqueous media. The variation between PPY and PPY-NCC in the crystallinity and thermal stability was studied by thermogravimetric analysis (TGA) and x-ray diffraction (XRD) respectively. © 2016 Smithers Information Ltd.

Keywords : Nanocrystalline celluloseSulfuric acid hydrolysisTotally chlorine freeEmpty fruit bunchUltrasonic treatment

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