ABSTRAK

Film konduktif menjadi salah satu alternatif material penyimpanan energi listrik yang ramah lingkungan. Penelitian ini bertujuan untuk mensintesis dan mengkarakterisasi film konduktif nanokomposit PVA/CS/GA/MWCNT. Film nanokomposit disintesis dengan metode *solution mixing* dan *casting* pada suhu ruang. Film hasil sintesis dikarakterisasi dengan FTIR (*Fourier Transform Infrared Spectroscopy*), SEM (*Scanning Electron Microscope*), XRD (*X-ray Diffraction*), *Thermal Gravimetric Analysis* (TGA), sifat mekanik dan uji konduktivitas. Spektra FTIR mengkonfirmasi interaksi komponen penyusun film nanokomposit melibatkan gugus fungsi hidroksil, amina, dan karbonil. Foto SEM menunjukkan permukaan film yang hampir serupa sebelum dan setelah penyisipan MWCNT, namun bagian *cross-section* mengindikasikan struktur berpori dengan penambahan MWCNT. Penambahan MWCNT kedalam film mengakibatkan menurunnya intensitas difraksi sinar-X film konduktif. Serta penambahan MWCNT menghasilkan kestabilan termal yang baik untuk film konduktif PVA/CS/GA. Pada pengujian sifat mekanik dihasilkan penurunan nilai kekuatan tarik (*tensile strength*) dari 0.22 MPa menjadi 0.078 Mpa, dan meningkatkan nilai % elongasi dari 64% menjadi 150% sebelum dan sesudah penambahan MWCNT. Nilai konduktivitas film meningkat dari 5×10^{-4} S/cm menjadi 4.92×10^{-2} S/cm setelah penambahan MWCNT.

Kata kunci: film konduktif, PVA, kitosan, MWCNT.

ABSTRACT

Conductive polymers are one of the alternative environmentally friendly electrical energy storage materials. This study aims to synthesize and characterize PVA / CS / GA / MWCNT nanocomposite conductive films. Nanocomposite films are synthesized by the solution mixing and casting method at room temperature. The synthesized film was characterized by FTIR (Fourier Transform Infrared Spectroscopy), SEM (Scanning Electron Microscope), XRD (X-ray Diffraction), Thermal Gravimetric Analysis (TGA), mechanical properties and conductivity test. FTIR spectra confirmed the interaction of the components of the nanocomposite film involving hydroxyl, amine and carbonyl functional groups. SEM photos showed almost the same surface of the film before and after MWCNT insertion, but the cross-section section indicated a porous structure with the addition of MWCNT. Adding MWCNT to the film resulted in a decrease in the intensity of conductive film X-ray diffraction. And the addition of MWCNT results in good thermal stability for PVA / CS / GA conductive films. Mechanical properties result in a decrease in tensile strength from 0.22 MPa to 0.078 Mpa, and increasing the value of% elongation from 64% to 150% before and after the addition of MWCNT. The conductivity value of the film increased from 5 x 10^{-4} S / cm to 4.92 x 10^{-2} S / cm after the addition of MWCNT.

Keywords: *conductive film, PVA, chitosan, MWCNT*