

INTISARI

KAJIAN SIFAT OPTIK NANOFIBER *REDUCED GRAPHENE OXIDE/POLY (3,4-ETHYLENEDIOXYTRIOPHENE):POLY (STYRENE SULFONATE) (PEDOT:PSS) HASIL ELECTROSPINNING*

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Telah berhasil dilakukan fabrikasi nanofiber *reduced graphene oxide* (rGO) dengan variasi konsentrasi dopan *poly (3,4-ethylenedioxytriophene):poly (styrene sulfonate)* (PEDOT:PSS) menggunakan *electrospinning*. Kajian diawali dengan sintesis graphene oxide dengan metode Hummer. Hasil karakterisasi menggunakan spektroskopi Raman, spektroskopi UV-Vis dan spektroskopi *Fourier Transform Infrared* (FTIR) menunjukkan bahwa graphene oxide telah terbentuk. Struktur morfologi nanofiber rGO/PEDOT:PSS diamati menggunakan *Scanning Electron Microscope* (SEM) dengan diameter rata-rata ($262,03 \pm 25,87$) nm dan ($227,23 \pm 27,97$) nm masing-masing untuk penambahan PEDOT:PSS 0,2 ml dan 0,8 ml. Kajian sifat optik nanofiber rGO/PEDOT:PSS berupa absorpsi optik dan indeks bias (n dan k). Pada nanofiber rGO diamati puncak serapan lebar pada energi sekitar 2,9 eV. Nilai indeks bias mengalami perubahan yang signifikan dengan penambahan PEDOT:PSS. Nilai koefisien *extinction* (k) semakin menurun dengan bertambahnya PEDOT:PSS, disebabkan karena adanya pita-pita baru atau semakin melebarnya celah pita. Penambahan PEDOT:PSS menunjukkan nilai n menurun pada rentang energi 3 hingga 6.2 eV dan meningkat pada rentang energi di bawah 3 eV. Nilai k yang semakin turun menunjukkan bahwa nanofiber rGO semakin transparan dengan penambahan PEDOT:PSS, sehingga berpotensi sebagai elektroda transparan dan konduktif.

Kata Kunci : nanofiber, graphene oxide, PEDOT:PSS, indeks bias kompleks

ABSTRACT

STUDY ON THE OPTICAL PROPERTIES OF REDUCED GRAPHENE OXIDE/POLY (3,4-ETHYLENEDIOXYTRIOPHENE):POLY (STYRENE SULFONATE) (PEDOT:PSS) ELECTROSPINNING NANOFIBERS

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Reduced graphene oxide (rGO) nanofibers have been successfully fabricated with variations of dopant concentration *poly (3,4-ethylenedioxytriophene):poly (styrene sulfonate)* (PEDOT:PSS) by electrospinning. The rGO nanofibers were prepared initially by synthesizing graphene oxide using Hummer's method. The result of Raman spectroscopy, UV-Vis spectroscopy and *Fourier Transform Infrared* (FTIR) spectroscopy showed that graphene oxide has been formed. Morphological structure of rGO/PEDOT:PSS nanofibers was observed by using *Scanning Electron Microscope* (SEM) with diameters (262.03 ± 25.87) nm and (227.23 ± 27.97) nm for additions PEDOT:PSS 0.2 ml and 0.8 ml, respectively. Study on optical properties rGO/PEDOT:PSS nanofibers was optical absorption and complex refractive index (n and k). It was observed that absorption width peak at 2.9 eV. We report significant changes of complex refractive index with the increasing of PEDOT:PSS. The value of extinction coefficient decreases with the addition PEDOT:PSS due to the new band or further widening of the band gap. Addition of PEDOT:PSS shows the value of n decreases at range 3 to 6.2 eV and increases at range below 3 eV. The decreasing value of k showed that rGO nanofibers more transparent with the addition of PEDOT/PSS, so it is potentially as a transparent and conductive electrode.

Keywords : nanofibers, graphene oxide, PEDOT:PSS, complex refractive index