

INTISARI

FUNGSIONALISASI NANOFIBER *REDUCED GRAPHENE OXIDE* SEBAGAI MATERIAL ELEKTRODA PADA APLIKASI KAPASITOR ELEKTROKIMIA

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Telah berhasil dilakukan fabrikasi nanofiber *reduced graphene oxide* (NRGO) dengan variasi massa *reduced graphene oxide* (rGO) 5 mg, 10 mg, 15 mg dan 20 mg menggunakan matriks polimer *Polyvinyl Alcohol* (PVA) melalui teknik *electrospinning* pada tegangan 10 kV. rGO yang digunakan diperoleh dari oksidasi *graphite* dengan metode Hummers kemudian direduksi menggunakan *hydrazine* 80 wt%. Hasil karakterisasi menggunakan spektroskopi UV-Vis dan *Fourier Transform Infrared* (FTIR) mengkonfirmasi bahwa rGO telah berhasil terbentuk. Struktur morfologi NRGO diamati menggunakan *Scanning Electron Microscopy* (SEM) dan diperoleh ukuran diameter NRGO semakin kecil seiring pertambahan massa rGO. Untuk mengetahui luas permukaan spesifik, ukuran pori dan struktur pori dari NRGO dilakukan karakterisasi *Brunauer-Emmet-Teller* (BET) dan diperoleh peningkatan ukuran pori seiring pertambahan massa rGO, kecuali pada NRGO_20mg. Selanjutnya NRGO digunakan sebagai material elektroda pada kapasitor elektrokimia yang kemudian kapasitansi spesifik dan kemampuan *charge-discharge* (CD) diukur melalui *Cyclic Voltammetry* (CV) menggunakan larutan KOH 2M sebagai elektrolit dan *filter paper* sebagai separator. Pengukuran kapasitansi spesifik kapasitor elektrokimia menunjukkan peningkatan kapasitansi spesifik seiring pertambahan massa rGO, kecuali pada NRGO_20mg. Kapasitansi spesifik tertinggi terjadi pada NRGO_15mg yaitu 0,048 F/g.

Kata kunci: nanofiber, *reduced graphene oxide*, PVA, *electrospinning*, kapasitor elektrokimia

ABSTRACT

FUNCTIONALIZATION REDUCED GRAPHENE OXIDE NANOFIBERS AS ELECTRODE MATERIALS IN ELECTROCHEMICAL CAPACITOR APPLICATION

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Reduced graphene Oxide nanofibers (NRGO) have been successfully fabricated with mass variations of rGO that is 5 mg, 10 mg, 15 mg and 20 mg using *Polyvinyl Alcohol* (PVA) as a polymer matrix by electrospinning technique at voltage 10 kV. The rGO was obtained from oxidation of graphite by using Hummers' method and was reduced by hydrazine 80 wt%. The result of UV-Vis spectroscopy and *Fourier Transform Infrared* (FTIR) spectroscopy confirmed that rGO have been formed. Morphological structure of NRGO was observed by using *Scanning Electron Microscopy* (SEM), and showed that addition of rGO to the solution will decrease the diameter size of NRGO. The specific surface area, pore size and pore structure was characterized by *Brunauer-Emmet-Teller* (BET) method and the pore size of NRGO was increased with the increasing of rGO mass. After that NRGO were used as electrode materials in electrochemical capacitor, the specific capacitance and charge-discharge (CD) performance was measured by *Cyclic Voltammetry* (CV) using 2M KOH aqueous solution as electrolyte and filter paper as separator. The spesifik capacitance of electrochemical capacitor measurement showed that specific capacitance of NRGO was increased with the increasing of rGO mass, except for NRGO_20mg. The highest specific capacitance was obtained by using NRGO_15mg that is 0,048 F/g

Keywords: nanofibers, *reduced graphene oxide*, PVA, *electrospinning*, electrochemical capacitor