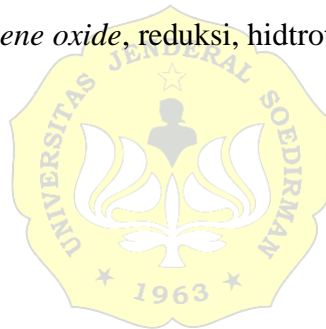


## ABSTRAK

Sintesis *reduced graphene oxide* (rGO) berbahan dasar biomassa tempurung kelapa menggunakan metode hidrotermal telah berhasil dilakukan, sintesis diawali dengan aktivasi arang tempurung kelapa menggunakan aktivasi kimia-fisika dengan aktivator Kalium Hidroksida (KOH) 90% dan pemanasan pada suhu 700 °C selama 2 jam. Setelah itu proses sintesis dilanjutkan dengan memvariasikan temperatur reduksi menggunakan metode hidrotermal sebesar 100, 140, dan 180 °C. *Reduced graphene oxide* (rGO) kemudian dikarakterisasi menggunakan XRD, FESEM, dan EDX, untuk melihat pola difraksi, ukuran kristal, jarak bidang kristal, jumlah bidang kristal, morfologi permukaan, dan persentase komposisi unsur kimia. Pengaruh temperatur reduksi dengan menggunakan metode hidrotermal pada sampel *reduced graphene oxide* (rGO) menunjukkan bahwa pola difraksi rGO menunjukkan puncak-puncak rGO, rata-rata ukuran kristal pada sampel rGO berukuran 0,753-0,898 nm, selain itu rata-rata jarak bidang kristal berkisar 0,233-0,292 nm, sedangkan rata-rata jumlah bidang kristal pada sampel rGO berkisar 4-5 lapisan. Morfologi permukaan rGO juga menunjukkan hasil berupa lembaran lembaran graphene, selain itu kandungan karbon pada rGO meningkat dari 87,8% mencapai 95,8% setelah dilakukan reduksi.

**Kata kunci:** *reduced graphene oxide*, reduksi, hidrotermal, tempurung kelapa



## ABSTRACT

*The synthesis of reduced graphene oxide (rGO) derived from coconut shell biomass has been successfully conducted using the hydrothermal method. The synthesis commenced with the activation of coconut shell charcoal through chemical-physical activation using 90% Potassium Hydroxide (KOH) as the activator, followed by heating at 700 °C for 2 hours. Subsequently, the synthesis process continued by varying the reduction temperature using the hydrothermal method at 100, 140, and 180 °C. The reduced graphene oxide (rGO) was then characterized using XRD, FESEM, and EDX to observe diffraction patterns, crystal size, crystal plane spacing, number of crystal planes, surface morphology, and percentage composition of chemical elements. The influence of reduction temperature using the hydrothermal method on the samples of reduced graphene oxide (rGO) indicated that the XRD pattern exhibited peaks characteristic of rGO. The average crystal size of the rGO samples ranged from 0.753 to 0.898 nm, with an average crystal plane spacing ranging from 0.233 to 0.292 nm. Additionally, the average number of crystal planes in the rGO samples ranged from 4 to 5 layers. Surface morphology analysis of rGO also revealed graphene sheet formations, while the carbon content in rGO increased from 87.8% to 95.8% after reduction.*

**Keywords:** *reduced graphene oxide, reduction, hydrothermal, coconut shell.*

