

Microwave irradiation-induced yield enhancement of coconut shell biomass-derived graphene-like material

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First Author	
Last Author	
Authors	Widanarto, W; Wulandari, R; Rahmawati, D; Cahyanto, WT; Sari, K; Effendi, M; Ghoshal, SK; Kurniawan, C;
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Abstract	<p>This paper reports a new strategy (rapid and selective microwave irradiation) to achieve an improved yield of graphene-like material derived from coconut shell biomass. The influence of various microwave irradiation (MWI) powers (80, 240, and 400 W) treatment on the crystalline structures, morphology, and electrochemical performance of the produced samples was determined and compared with the virgin-untreated specimen. The obtained samples were analyzed using varied analytical techniques. The FESEM images of the irradiated samples revealed the existence of graphene-like morphologies accompanied by some thin and transparent sheets. The sample at 80 W displayed the best quality with the highest yield, improving the carbon content, reducing the oxygen functional groups, and increasing the BET-specific surface area by as much as 1238.48 m²/g. The electrochemical properties of the sample treated at 80 W (optimum MWI power treatment) exhibited rectangular curves against scanning speeds, indicating an ideal capacitive behaviour called electric double-layer capacitance (EDLC). It is asserted that the proposed systematic and eco-friendly approach in obtaining the high-performance graphene-like material at low cost may open up sundry opportunities for practical applications, leading towards sustainable development.</p>
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Author	WAHYU TRI CAHYANTO, S.Si, M.Si, Ph.D