Biomas waste-derved graphene synthesis using novel flash-joule hot plasma; a circular economy approach = Sintesis graphene yang berasal dari limbah biomassa menggunakan plasma panas flash-joule baru; pendekatan ekonomi sirkular

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Abstrak

PET plastic bottle waste and biomass are an urgent environmental pollution problem due to their abundance. Through circular economy, more than reducing pollution, waste materials and polymers can be increased in value through recycled synthesis into advanced materials. Amorphous carbon was obtained through a pyrolysis process at 400 oC for 2 hours from PET plastic bottle waste. To improve carbon performance, activation was carried out using a strong base KOH with variations of KOH to the number of carbons of 1:2, 1:3, 1:4 to obtain activated carbon with high surface area and conductivity. The activated carbon that was successfully synthesized was then subjected to XRD (X-Ray Diffraction) and BET (Brunauer Emmett Teller) characterization tests. The flash joule process will be carried out using an artificial apparatus that uses a power supply, capacitor and quartz tube as a synthesis site. Through a capacitor and power supply, high voltage electricity can be delivered to the activated carbon that has been placed in the quartz tube. This process only takes about 1-2 seconds because the hot plasma process does not require a long time to synthesize turbostratic graphene produced by this flash joule process. The synthesized turbostratic flash joule graphene was then subjected to SEM (Scanning Electron Microscopy), EDS (Energy Dispersive Spectroscopy), XRD (X-Ray Diffraction), BET (Brunauer Emmett Teller), Raman Spectroscopy, and Fourier Transformation Infrared Spectroscopy (FTIR) characterization tests.
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