



Characteristics of Carbonized Corncob through Hydrothermal and Pyrolysis Conversion Techniques for Further Activation

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Abstract. The eco-friendly technique which converted the low cost waste residues such as corncob to the valuable material such as solid fuel or advanced material is favourable. This study aims to enhance the knowledge limitation of key elements characteristics of carbonized corncob including fibre constituents, Brunauer-Emmett-Teller surface area and Fourier Transform Infrared spectroscopy as the precursor material for further activation to produce the bio-based activated carbon via the mild temperature hydrothermal technique with demonstrated scale reactor comparing to high temperature pyrolysis. The hydrothermal carbonization takes place in 10 litres reactor at 250 °C. The pyrolysis is operated at 480 °C. The Brunauer-Emmett-Teller surface area of corncob feedstock, hydrochar derived from hydrothermal and biochar derived from pyrolysis are 16.13, 11.53 and 7.66 m² g⁻¹ respectively. The oxygenated functional groups contents and high BET surface area of hydrochar are more predominant than biochar. Henceforth, the optimization for better degradation of fibre constituents through the mild temperature hydrothermal conversion technique will be the future work before the activation step.

Keywords: Hydrothermal carbonization, Hydrochar, Corncob, Bio-based activated carbon, Pyrolysis.