

Accepted Manuscript

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PII: S1385-8947(15)00871-2
DOI: <http://dx.doi.org/10.1016/j.cej.2015.06.032>
Reference: CEJ 13803

To appear in: *Chemical Engineering Journal*

Received Date: 12 April 2015
Revised Date: 5 June 2015
Accepted Date: 7 June 2015



Please cite this article as: A. Alabadi, S. Razzaque, Y. Yang, S. Chen, B. Tan, Highly Porous Activated Carbon Materials from Carbonized Biomass with High CO₂ Capturing Capacity, *Chemical Engineering Journal* (2015), doi: <http://dx.doi.org/10.1016/j.cej.2015.06.032>

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Highly Porous Activated Carbon Materials from Carbonized Biomass with High CO₂ Capturing Capacity

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ABSTRACT

Activated carbon material is considered as a promising porous motif for the adsorption and storage applications. Activated carbon materials were prepared from biomass (gelatin and starch) by employing the dry chemical activation, possessing relatively high surface areas from (1636 - 1957 m² g⁻¹) and abundant micropores with a pore size ca. 1.95 nm. A remarkably high CO₂ adsorption (7.49 mmol.g⁻¹ at 0 °C and 1 bar) for GSK1-700 was recorded, that might be attributed to the unique microstructure and introduction of oxygen and nitrogen functionalities by superficial treatment. ACs showed good ideal selectivities for CO₂/N₂ (52-98). The heat of adsorption was determined by CO₂ adsorption, while the morphology was observed by FE-SEM and F-TEM, and chemical compositions of the as-prepared activated carbons were analyzed via elemental analysis, XPS and FT-IR spectra.

Keywords: Porous carbons, CO₂ adsorption, Activated carbon, Biomass, Nitrogen content

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