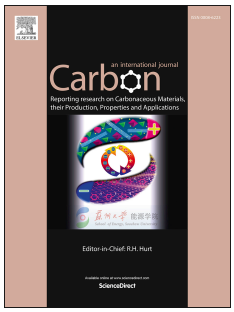
Accepted Manuscript



Selective oxidation rapidly decomposes biomass-based activated carbons into graphite-like crystallites

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PII: S0008-6223(18)30826-1

DOI: 10.1016/j.carbon.2018.09.018

Reference: CARBON 13446

To appear in: *Carbon*

Received Date: 4 June 2018

Revised Date: 27 August 2018

Accepted Date: 3 September 2018

Please cite this article as: M. Miao, S. Zuo, Y. Zhao, Y. Wang, H. Xia, C. Tan, H. Gao, Selective oxidation rapidly decomposes biomass-based activated carbons into graphite-like crystallites, *Carbon* (2018), doi: 10.1016/j.carbon.2018.09.018.

Selective oxidation rapidly decomposes biomass-based activated carbons into graphite-like crystallites

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Abstract

Graphite-like crystallites are the predominant structures that are strongly bonded together via amorphous carbons in biomass-based activated carbon. Here, we demonstrate a scalable process for efficiently decomposing biomass-based activated carbons into independent graphite-like crystallites with a high yield of 78 wt.% by a selective oxidation scheme to rapidly break the amorphous carbon parts between graphite-like crystallites." The results show that the obtained graphite-like crystallite-based nanomaterials with tunable dimensions and morphologies has remarkable features, such as high water solubility and a strong tendency to self-assemble into a film structure.

The basic structural units of nanosize in bulk materials are an important source to create novel nanomaterials by the top-down approach. Graphite-like crystallites are consist of defective micro-graphene layers of a polycyclic aromatic nature that arrange in an approximately parallel way. [1-4] They widely exist as the major structures in many biomass activated carbons (BACs) produced by carbonization of natural products. In these bulk carbon materials, the crystallites are strongly bound together by chemical bonding via amorphous carbon components, [2] as illustrated in Figure 1a.

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