

Accepted Manuscript

Co-pyrolysis Mechanism of Seaweed Polysaccharides and Cellulose Based on Macroscopic Experiments and Molecular Simulations

Shuang Wang, Zhen Xia, Yamin Hu, Zhixia He, Benjamin Bernard Uzoejinwa, Qian Wang, Bin Cao, Shanna Xu

PII: S0960-8524(16)31655-8

DOI: <http://dx.doi.org/10.1016/j.biortech.2016.12.004>

Reference: BITE 17380

To appear in: *Bioresource Technology*

Received Date: 25 September 2016

Revised Date: 30 November 2016

Accepted Date: 1 December 2016

Please cite this article as: Wang, S., Xia, Z., Hu, Y., He, Z., Bernard Uzoejinwa, B., Wang, Q., Cao, B., Xu, S., Co-pyrolysis Mechanism of Seaweed Polysaccharides and Cellulose Based on Macroscopic Experiments and Molecular Simulations, *Bioresource Technology* (2016), doi: <http://dx.doi.org/10.1016/j.biortech.2016.12.004>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Co-pyrolysis Mechanism of Seaweed Polysaccharides and Cellulose Based on Macroscopic
Experiments and Molecular Simulations

Shuang Wang^{*1}, Zhen Xia¹, Yamin Hu¹, Zhixia He¹, Benjamin Bernard Uzoejinwa³, Qian Wang^{*1}, Bin Cao¹,
Shanna Xu²¹

(1. School of Energy and Power Engineering, Jiangsu University, Jiangsu 212013, China;

2. Key Laboratory of South China Sea Fishery Resources Exploitation & Utilization, Ministry of Agriculture,
South China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences, Guangzhou 510300,
China; 3. Department of Agricultural and Bioresources Engineering, University of Nigeria, Nsukka, Nigeria.)

Abstract: Co-pyrolysis conversion of seaweed (*Enteromorpha clathrata* and *Sargassum fusiforme*) polysaccharides and cellulose has been investigated. From the Py-GC/MS results, *Enteromorpha clathrata* (EN) polysaccharides pyrolysis mainly forms furans; while the products of *Sargassum fusiforme* (SA) polysaccharides pyrolysis are mainly acid esters. The formation mechanisms of H₂O, CO₂, and SO₂ during the pyrolysis of seaweed polysaccharides were analyzed using the thermogravimetric-mass spectrometry. Meanwhile the pyrolysis of seaweed polysaccharide based on the Amber and the ReaxFF force fields, has also been proposed and simulated respectively. The simulation results coincided with the experimental results. During the fast pyrolysis, strong synergistic effects among cellulose and seaweed polysaccharide molecules have been simulated. By comparing the experimental and simulation value, it has been found that co-pyrolysis could increase the number of molecular fragments, increase the pyrolysis

* Corresponding author. Tel/fax: +86 511 84439919

Email address: alexjuven@ujs.edu.cn; qwang@ujs.edu.cn

Download English Version:

<https://daneshyari.com/en/article/4997762>

Download Persian Version:

<https://daneshyari.com/article/4997762>

[Daneshyari.com](https://daneshyari.com)