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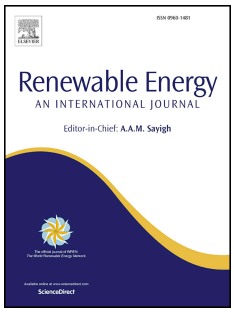

Supercritical ethanolysis of wheat stalk over calcium oxide

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PII: S0960-1481(17)31282-X

DOI: 10.1016/j.renene.2017.12.078

Reference: RENE 9575

To appear in: *Renewable Energy*

Received Date: 23 December 2016

Revised Date: 19 October 2017

Accepted Date: 22 December 2017

Please cite this article as: Li W-G, Zhao W, Liu H-M, Ao L, Liu K-S, Guan Y-S, Zai S-F, Chen S-L, Zong Z-M, Wei X-Y, Supercritical ethanolysis of wheat stalk over calcium oxide, *Renewable Energy* (2018), doi: 10.1016/j.renene.2017.12.078.

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ABSTRACT

Catalysts C_{600}, C_{700}, and C_{800} prepared from $Ca(CH_3COO)_2$ calcination at 600, 700, and 800 ^oC, respectively, were characterized with an X-ray diffractometer, scanning electron microscope, and specific surface area analyzer. Over the catalysts, bio-oils (BOs) were obtained by the supercritical ethanolysis (SCE) of wheat stalk powder (WSP). Their yields, ultimate analyses, chemical composition and some fuel properties were investigated. WSP and the residues from the SCE of WSP were analyzed with a Fourier transform infrared spectrometer. The results show that C_{700} has a small particle size and large specific surface area, and can effectively catalyze the SCE of WSP. The BO yields from non-catalytic, C_{600}-, C_{700}-, and C_{800}-catalyzed SCE of WSP ae 30.1，22.9，70.7 and 34.4%, respectively. BO_{700} from C_{700}-catalyzed SCE of WSP has relatively higher H/C and H/O ratios and calorific value but lower acidity, kinematic viscosity, and water content. The relative content of alcohols in the BO obviously increased, while the contents of carboxylic acids, ethyl esters, and anhydrides decreased over C_{700}.

Keywords: wheat stalk; supercritical ethanol; calcium oxide; bio-oil

1. Introduction

As both renewable energy and chemical feedstock, biomass is the best to replace nonrenewable