ABSTRAK

SINTESIS ZEOLIT MORDENIT (MOR) BERBASIS SILIKA ABU AMPAS TEBU MENGGUNAKAN BIO-MESOPOROGEN PATI DAN UJI AKTIVITAS KATALITIK PADA REAKSI HIDROLISIS SELULOSA KULIT SINGKONG UNTUK PRODUKSI GLUKOSA

Oleh

VINCENT FERDINANDL

Pada penelitian ini, dilakukan sintesis, karakterisasi, dan uji aktivitas katalitik zeolit-MOR berbasis silika yang berasal dari abu ampas tebu (*Sugarcanne Bagasse Ash*/SCBA) sebagai katalis pada reaksi hidrolisis selulosa kulit singkong. Tahapan penelitian yang dilakukan yaitu ekstraksi silika SCBA sebagai bahan dasar sintesis zeolit-MOR SCBA mesoporogen kemudian sebagai pembanding disintesis zeolit-MOR berbasis silika SCBA tanpa mesoporogen dan dilakukan *ion-exchange*, serta uji katalitik. Karakterisasi silika menggunakan XRD, XRF, dan FTIR. Zeolit-MOR (Mesoporogen) dan (Tanpa Mesoporogen) disintesis menggunakan metode hidrotermal pada suhu 180˚C selama 6 hari. Zeolit-MOR SCBA telah berhasil disintesis karena memiliki kecocokan dengan difraktogram zeolit-MOR standar. Rasio Si/Al zeolit-MOR SCBA sebesar 3,645 % didapat melalui karakterisasi XRF. Zeolit-MOR SCBA memiliki luas permukaan 20,931 m^2 /g ; volume total pori 5,026 x 10^{-3} cm^3/g ; dan rata-rata diameter pori sebesar 3,2341 nm didapat melalui karakterisasi BET. Analisis kandungan selulosa menggunakan karakterisasi UV-Vis (540 nm) sebesar 98% dalam tepung kulit singkong. Hasil uji katalitik menunjukkan kondisi reaksi optimum berada pada suhu 140 ˚C selama 3 jam dengan rasio katalis 1:1 menggunakan katalis zeolit H-MOR SCBA mesoporogen dan tanpa mesoporogen yang memberikan konsentrasi gula pereduksi sebesar 326,254 ppm dan 260,192 ppm.

Kata Kunci : Silika SCBA, H-MOR pori hierarki, Reaksi hidrolisis.

ABSTRAK

SYNTHESIS OF MORDENITE ZEOLITE (MOR) BASED ON SILICA SUGARCASE ASH USING BIO-MESOPOROGEN STARCH AND CATALYTIC ACTIVITY TEST ON THE HYDROLYSIS OF CASSAVA SKIN CELLULOSE FOR GLUCOSE PRODUCTION

By

VINCENT FERDINANDL

In this study, carried out the synthesis, characterization, and test the catalytic activity of zeolite-MOR based on silica derived from bagasse ash (Sugarcanne Bagasse Ash/SCBA) as a catalyst in the hydrolysis reaction of cassava peel cellulose. The stages of the research carried out were extraction of SCBA silica as the basic material for the synthesis of zeolite-MOR SCBA mesoporogen and then as a comparison, synthesized zeolite-MOR based on SCBA silica without mesoporogen, ion-exchange, and catalytic tests. Silica characterization using XRD, XRF, and FTIR. Zeolite-MOR (mesoporogen) and (without mesoporogen) were synthesized using hydrothermal method at 180 ˚C for 6 days. Zeolite-MOR SCBA has been successfully synthesized because it has a good match with the standard zeolite-MOR diffractogram. The ratio of Si/Al zeolite-MOR SCBA of 3.645 % was obtained through XRF characterization. Zeolite-MOR SCBA has a surface area of 20.931 m^2/g; total pore volume 5.026 x 10^{-3} cm^3/g ; and the average pore diameter of 3.2341 nm was obtained through BET characterization. Analysis of cellulose content using UV-Vis (540 nm) was 98 % in cassava peel flour. The results of the catalytic test showed that the optimum reaction conditions were at a temperature of 140 ˚C for 3 hours with a catalyst ratio of 1:1 using a mesoporogen H-MOR SCBA zeolite catalyst and without mesoporogen which gave reducing sugar concentrations of 326.254 ppm and 260.192 ppm.

Keywords: SCBA silica, hierarchical pore H-MOR, hydrolysis reaction.