

## ABSTRAK

### SINTESIS ZEOLIT ANALSIM DAN Na-P PORI HIERARKI BERBASIS SILIKA AMPAS TEBU MENGGUNAKAN PATI SEBAGAI MESOPOROGEN SERTA UJI AKTIVITAS KATALIK PADA REAKSI ISOMERISASI GLUKOSA

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Pada penelitian ini, dilakukan uji aktivitas katalitik pada zeolit analsim dan Na-P pori hierarki berbasis silika ampas tebu (Sugarcane Bagasse Ash/SCBA) menggunakan pati sebagai mesoporogen pada reaksi isomerisasi glukosa. Penelitian ini diawali dengan ekstraksi silika menggunakan metode alkali dari abu ampas tebu sebagai prekursor utama pada sintesis zeolit analsim dan Na-P. Hasil sintesis dilakukan penukaran ion dan uji aktivitas katalis. Karakterisasi silika menggunakan XRD, XRF, dan FTIR. Fasa amorf mendominasi silika ampas tebu dengan perbandingan Si/Al 1,4 dan terkonfirmasi adanya gugus fungsi siloksan dan silanol dengan FTIR. Zeolit analsim dan Na-P berhasil disintesis. Hal ini dinyatakan melalui kemiripan bentuk difraktogram zeolit analsim dan Na-P terhadap standar dengan memiliki tingkat kristalinitas sebesar 44,90% dan 58,12%. Perbandingan Si/Al didapatkan sebesar 1,98 dan 1,79 menggunakan XRF. Adanya penambahan pori ada analsim dan Na-P sekitar 2,272 dan 3,246 nm menggunakan BET. Kondisi optimum aktivitas katalis pada waktu 30 menit untuk zeolit analsim dan 20 menit untuk zeolit Na-P pada suhu 80°C dengan 0,03 g dari katalis. Konsentrasi glukosa yang minimum diperoleh dengan menggunakan zeolit Na-P yaitu sebesar 90,88 mg/L dengan konversi glukosa sebesar 29,92% sedangkan zeolit analsim sebesar 93,11 mg/L dengan konversi glukosa sebesar 28,21%.

Kata kunci : Silika SCBA, zeolit analsim dan Na-P, reaksi isomerisasi glukosa

## ABSTRACT

### SYNTHESIS OF HIERARCHICAL POROUS ANALCIME AND Na-P ZEOLITES BASED ON SILICA OF SUGARCANE BAGASSE USING STARCH AS MESOPOROGEN AND CATALYTIC TEST FOR THE ISOMERIZATION GLUCOSE

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In this study, catalytic activity was carried out on hierarchical porous analcime and Na-P zeolites based on bagasse silica (Sugarcane Bagasse Ash/SCBA) using starch as a mesoporous in the glucose isomerization reaction. The first steps of research were carried out by extracting silica using the alkaline method from bagasse ash as the main precursor in the synthesis of analcime and Na-P zeolites. The result of the synthesis of zeolite was carried out with ion exchange and tested on catalytic activity. Characterizations of silica were using XRD, XRF, and FTIR. The phase of sugarcane bagasse ash (SCBA) was dominated by amorph, the ratio of Si/Al was 1.4 and confirmed the presence of siloxane and silanol functional group from FTIR. Analcime and Na-P zeolite were successfully synthesized. It was confirmed from the diffractogram that has similarities to the standard diffractogram pattern and analcime and Na-P had 44.90% and 58.12% crystallinity. The ratio of Si/Al was obtained at 1.98 and 1.79 from XRF. The presence of additional pores in analcime and Na-P pores were 2.272 and 3.246 nm were confirmed from BET. The optimum condition of catalytic activity was 30 minutes for analcime and 20 minutes for Na-P zeolite at 80°C by using 0.03 g of the catalyst. The minimum glucose concentration was obtained by using Na-P zeolite which was 90.88 mg/L with a conversion of glucose 29.92% and the analcime zeolite was 93.11 mg/L with a conversion of glucose 28.21%.

Keywords: SCBA silica, analcime, Na-P zeolites, isomerization glucose