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ESTERIFICATION OF ACETIC ACID AND BENZYL ALCOHOL OVER ZEOLITE HX PRODUCED FROM BANGKA BELITUNG KAOLIN

(Pengesteran Asid Asetik dan Benzil Alkohol ke atas Zeolit HX Dihasilkan daripada Kaolin Bangka Belitung)

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Abstract

The activity of zeolite HX acid catalyst synthesized from kaolin was investigated for esterification of acetic acid with benzyl alcohol. Zeolite HX was synthesized using kaolin minerals obtained from Bangka Belitung Sumatra, Indonesia *via* hydrothermal method and followed by cation exchange treatment. The conversion of acetic acid was driven by the presence of Brønsted acidity with the porosity plays a crucial role in determining product selectivity. The influence of reactants concentration, the effect of reaction time and the amount of catalyst loading were investigated to obtain optimum condition of the reaction. Zeolite HX catalyzed esterification of acetic acid to achieve 58.78% of conversion with increasing the concentrations of benzyl alcohol enhanced the conversion. The acetic acid esterification follows the Eley-Rideal mechanism with the conversion improved by prolonging the reaction time and increasing the amount of catalyst used in the system.

Keywords: zeolite HX, kaolin, esterification, benzyl alcohol, fragrance

Abstrak

Aktiviti mangkin zeolit HX di sintesis daripada kaolin telah dikaji untuk pengesteran asid asetik dan benzil alkohol. Zeolit HX telah di sintesis menggunakan mineral kaolin daripada Bangka Belitung (Sumatra, Indonesia) melalui kaedah hidrotermal dan diikuti rawatan penukaran kation. Aktiviti zeolit ditentukan oleh keasidan intrinsik Brønsted dengan keliangan zeolit HX memainkan peranan penting dalam pemilihan bentuknya. Pengoptimuman terperinci parameter proses seperti nisbah molar, tindak balas masa dan pemangkin ke atas HX juga dijalankan untuk menilai kesan optimum pada aktiviti pemangkin dan pemilihan. Zeolit HX didapati menjadi pemangkin untuk pengesteran dengan penukaran asid asetik sehingga 58.78% diperolehi dengan peningkatan kepekatan benzil alkohol. Pengesteran asid asetik mengikut mekanisma Eley-Rideal menghasilkan penukaran lebih baik dengan peningkatan dalam masa tindak balas dan jumlah makin yang digunakan di dalam sistem.

Kata kunci: zeolit HX, kaolin, pengesteran, benzil alkohol, bau-bauan