

# **SINTESIS LEMPUNG TERPILAR $\text{SiO}_2/\text{Ni}$ DARI LEMPUNG ALAM SERTA UJI AKTIVITASNYA SEBAGAI KATALIS ESTERIFIKASI ASAM ASETAT-ETANOL**

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## **RINGKASAN**

Sintesis senyawa ester selama ini umum dilakukan dengan menggunakan katalis asam homogen seperti asam sulfat. Dengan metode ini harus dilakukan penetralan dan pencucian terhadap produk ester untuk menghilangkan kelebihan asam, namun dengan menggunakan katalis heterogen seperti lempung terpillar diharapkan penanganan produk menjadi lebih mudah. Tujuan penelitian ini adalah mensintesis lempung terpillar silika teremban nikel yang dapat dimanfaatkan sebagai katalis esterifikasi asam asetat-etanol.

Sintesis lempung terpillar silika ( $\text{SiO}_2$ ) dilakukan melalui interkalasi TEOS (tetraetilortosilikat) dan surfaktan dodesilamin di daerah antarlapis lempung. Karakterisasi hasil meliputi *basal spacing* dan kristalinitas dengan menggunakan difraksi sinar X. Selanjutnya, lempung terpillar hasil sintesis diimpregnasi dengan nikel. Uji aktivitas katalitik lempung terpillar teremban nikel dilakukan terhadap reaksi esterifikasi asam asetat-etanol. Analisis produk esterifikasi dilakukan dengan menggunakan kromatografi gas.

Kalsinasi lempung terinterkalasi TEOS pada temperatur  $600^\circ\text{C}$  menghasilkan lempung terpillar silika dengan *basal spacing*  $23,33 \text{ \AA}$  dan persen kristalinitas sebesar 94,47%. Aplikasi sebagai katalis esterifikasi menunjukkan lempung terpillar  $\text{SiO}_2$  teremban nikel mampu mengkatalisis esterifikasi asam asetat-etanol. Semakin besar konsentrasi nikel yang teremban dalam lempung terpillar, semakin besar aktivitas katalisnya.

## SUMMARY

Synthesis of ester compounds are commonly done using sulphuric acid as catalyst. The method covers neutralization and washing out of the ester product. By the use of a heterogeneous catalyst, it is expected that the reaction process will be simplified. This research is aimed to synthesize nickel-supported silica pillared clay used as esterification catalyst of acetic acid with ethanol.

Synthesis of silica ( $\text{SiO}_2$ ) pillared clay was prepared by intercalation of TEOS (tetraethylorthosilicate) and surfactant dodecylamine in the interlayer region. The product of synthesis was characterized its basal spacing and crystallinity by X-ray diffraction. Then, the resulted pillared clay was impregnated with nickel. Catalytic activities of nickel-supported silica pillared clay were tested for the acetic acid esterification with ethanol. The liquid product of reaction were then analyzed by gas chromatography.

Calcination of TEOS intercalated clay at 600 °C resulted a silica pillared clay with basal spacing of 23.33 Å and crystallinity of 94.47%. Application as catalyst for esterification showed that nickel-supported silica pillared clay were able to catalyze the esterification reaction. By the rise of nickel impregnated at silica pillared clay, the catalytic activity becomes greater.

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