



## **SILILASI EKSTERNAL PADA MCM-48 YANG DISINTESIS PADA TEMPERATUR KAMAR**

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### **INTISARI**

Kajian mengenai sililasi secara parsial pada permukaan eksternal MCM-48 telah dilakukan. Tujuan penelitian ini untuk mengetahui kondisi optimum sililasi eksternal pada MCM-48 yang disintesis pada temperatur kamar sehingga dihasilkan MCM-48 tersililasi eksternal dengan kristalinitas yang tinggi.

Sintesis MCM-48 dilakukan dengan metode temperatur kamar selama 16 jam dan selanjutnya dilakukan sililasi eksternal MCM-48 pada temperatur 60 °C selama 6 jam. Beberapa faktor yang mempengaruhi efisiensi sililasi eksternal pada MCM-48 dipelajari seperti waktu kontak antara agen sililasi *trimethylchlorosilane* (TMCS) dengan MCM-48 dan rasio TMCS/toluena (v/v). MCM-48 tersililasi eksternal yang dihasilkan dikarakterisasi dengan Difraksi Sinar-X (XRD), Spektroskopi *Fourier Transform Infra Red* (FTIR), *Transmission Electron Microscopy* (TEM) dan adsorpsi-desorpsi N<sub>2</sub>.

Hasil penelitian menunjukkan bahwa kondisi optimum sililasi eksternal untuk menghasilkan MCM-48 tersililasi eksternal dengan kristalinitas dan keteraturan pori tinggi yaitu pada waktu kontak antara TMCS dengan MCM-48 selama 6 jam dan rasio TMCS/toluena 10% (v/v). Kajian pengaruh rasio TMCS/toluena (v/v) menunjukkan bahwa semakin besar rasio TMCS/toluena (v/v) akan meningkatkan derajat sililasi MCM-48. Pola spektra FTIR yang diperoleh menunjukkan bahwa gugus-gugus penyusun surfaktan *Cetyltrimethylammonium bromide* (CTAB) hilang setelah melalui sililasi. Hasil karakterisasi adsorpsi-desorpsi N<sub>2</sub> menunjukkan MCM-48 tersililasi eksternal memiliki luas permukaan spesifik 1372,531 m<sup>2</sup> g<sup>-1</sup>, volume pori spesifik 0,177 cc g<sup>-1</sup>, rata-rata diameter pori 2,56 nm.

Kata kunci: MCM-48, temperatur kamar, sililasi eksternal, *trimethylchlorosilane*.



## **EXTERNAL SILYLATION OF MCM-48 SYNTHESIZED AT ROOM TEMPERATURE**

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### **ABSTRACT**

Partial silylation on external surface of MCM-48 has been studied. This research was performed to find the optimum condition to synthesize external silylated MCM-48 at room temperature.

Synthesize of MCM-48 carried out by room temperature method and silylated at 60 °C for 6 hours. Some factors effects efficiency of external silylation , i.e. contact time between silylating agent trimethylchlorosilane (TMCS) with MCM-48 and volume ratios TMCS/toluene has been studied. External silylated MCM-48 were characterized by X-Ray Diffraction (XRD), Fourier Transform Infra Red (FTIR) Spectroscopy, Transmission Electron Microscopy (TEM) and adsorption-desorption of N<sub>2</sub> methods.

The result of study showed that the optimum conditions to get external silylated MCM-48 with higher crystallinity and ordered mesopore are as follows : optimum contact time between silylating agent TMCS with MCM-48 is 6 hours and the optimum volume ratios of TMCS/toluene is 10% (v/v). Study of the effects of volume ratios TMCS/toluene showed that the higher volume ratios of TMCS/toluene increased silylation degree of MCM-48. The FTIR spectra pattern showed that silylation can removed the surfactant. The result of adsorption-desorption of N<sub>2</sub> characterization showed that external silylated MCM-48 has specific surface area 1372.531 m<sup>2</sup> g<sup>-1</sup>, specific pore volume 0.177 cc g<sup>-1</sup>, and average pore diameter up to 2.26 nm.

**Key words:** MCM-48, room temperature, external silylation, trimethylchlorosilane.