

Studi Adsorpsi Fenilasetilena dan Reaksinya dengan CO₂ pada Katalis Cu/MC = Study of Phenylacetylene Adsorption and Its Reaction with CO₂ on Cu/MC Catalyst

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Abstrak

Konsentrasi CO₂ di dalam atmosfer yang terus meningkat menjadi perhatian bagi peneliti untuk mengkonversi CO₂ menjadi senyawa yang lebih ramah lingkungan serta bermanfaat. Dalam penelitian ini, dilakukan studi adsorpsi dan reaksi karboksilasi untuk mengkonversi CO₂ menggunakan substrat fenilasetilena, katalis heterogen Cu/MC, dan basa Cs₂CO₃ pada suhu 75C. Hasil sintesis karbon mesopori (MC) dikarakterisasi dengan FTIR dan SEMEDX-

Mapping. Hasil FTIR MC memperlihatkan proses karbonisasi yang belum sempurna, ditandai dengan adanya peak C-O dan O-H. Namun hasil SEM-EDX-Mapping memperlihatkan struktur pori yang cukup seragam dengan komposisi unsur C mencapai 86.01% dan unsur O mencapai 13.99%. Hasil sintesis Cu/MC dikarakterisasi dengan FTIR dan SEM-EDX yang menunjukkan bertambahnya gugus C=C terkonjugasi sehingga komposisi C meningkat menjadi 82,34%, sementara komposisi O sekitar 15,34%, dan komposisi Cu sekitar 02,32%. Hasil karboksilasi fenilasetilena dengan CO₂ menunjukkan terbentuknya produk asam-3-fenil propiolat namun dalam jumlah yang sangat sedikit. Dalam penelitian ini juga diuji sifat adsorpsi fenilasetilena pada Cu/MC dan adsorpsi fenilasetilena pada MC dengan adanya penambahan basa Cs₂CO₃. Berdasarkan hasil HPLC uji adsorpsi fenilasetilena, diketahui bahwa adsorpsi fenilasetilena pada Cu/MC lebih baik daripada adsorpsi fenilasetilena pada MC.

.....Concentration of CO₂ in the atmosphere that continues to increase is a concern for researchers to convert CO₂ into compounds that are more environmentally friendly and useful. In this research, study of phenylethethylene adsorption and carboxylation reaction were carried out. The carboxylation reaction to convert CO₂ required phenylacetylene as substrate, Cu/MC as heterogeneous catalyst, and Cs₂CO₃ as base (source of nucleophile). The carboxylation reactions were carried out at 75C. The results of mesoporous carbon synthesis (MC) were characterized by FTIR and SEM-EDX-Mapping. The FTIR MC results show that the carbonization process is not perfect, characterized by the peak C-O and O-H. But the SEM-EDX-Mapping results show a fairly uniform pore structure with the composition of element C reaching 86.01% and element O reaching 13.99%. The results of

Cu/MC synthesis were characterized by FTIR and SEM-EDX which showed an increase in the conjugated C = C group so that the composition of C increased to 82.34%, while the composition of O was around 15.34%, and the composition of Cu was around 02.32%. The carboxylation of phenylacetylene with CO₂ showed the formation of acid-3-phenyl propiolic products but in very small amounts. In this study also tested the properties of phenylacetylene adsorption on Cu/MC and phenylacetylene adsorption on MC with the addition of Cs₂CO₃ base. Based on the results of HPLC phenylacetylene adsorption test, it is known that the adsorption of phenylacetylene in Cu/MC is better than phenylacetylene adsorption on MC.