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

Richika Hapsari, author

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 memperlihat 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 menunjukan 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.