

# Studi morfologi deposit Cu melalui elektrodposisi paduan logam Cu-Zn dan aplikasinya sebagai katalis reduksi CO<sub>2</sub> = Study of copper deposit morphologies by electrodepositioning Cu-Zn alloy and its application as catalyst in CO<sub>2</sub> reduction / Putu Udiyani Prayika Putri

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## Abstrak

Pada penelitian ini, konversi CO<sub>2</sub> dilakukan melalui metode elektrokimia dengan proses elektrodposisi katalis paduan logam (alloy) Cu dan Zn pada elektroda emas pada potensial -0,5 V, kemudian dilakukan dealloying Zn dengan larutan NaOH dan HCl sehingga terbentuklah material Cu berpori dengan selular terbuka yang dapat memperbesar luas permukaan dengan mengatur porositasnya. Dilakukan tiga variasi volume Zn pada masing-masing elektroda, yaitu 1,25 mL; 2,5 mL; dan 3,75 mL serta dihasilkan struktur morfologi yang beragam, dimana Cu mewakili bentuk globular dan Zn mewakili bentuk heksagonal. Elektroda emas berdeposit Cu digunakan untuk mengkonversi CO<sub>2</sub> dalam cairan ionik [BMIM][NTf<sub>2</sub>] melalui proses reduksi pada potensial -2,1 V disertai penambahan CH<sub>3</sub>OH dan CH<sub>3</sub>I untuk membentuk dimetil karbonat. Untuk elektroda yang mengandung 1,25 mL; 2,5 mL; dan 3,75 mL Zn masing-masingnya menghasilkan 63,314%, 16,380%, dan 13,379% produk hasil proses reduksi CO<sub>2</sub>, sehingga diperoleh kondisi optimum dengan elektroda yang mengandung 1,25 mL Zn yang menghasilkan produk dimetil karbonat terbanyak.

.....In this research, conversion of CO<sub>2</sub> was done by electrochemical method with the electrodeposition process of the catalyst metal alloys Cu and Zn on the gold electrodes at -0.5 V, then performed with a solution of NaOH and HCl in dealloying Zn so that it formed a material with an open cellular porous Cu that can enlarge the surface area by setting its porous. Three variations of volume of Zn in respective electrodes were done, named 1.25 mL; 2.5 mL; and 3.75 mL, resulting diverse morphology that Cu structures represented the globular shape and Zn represented the hexagonal shape. Gold electrode with Cu deposit was used for converting CO<sub>2</sub> in ionic liquid [BMIM] [NTf<sub>2</sub>] through the process of the reduction potential at - 2.1 V with the addition of CH<sub>3</sub>OH and CH<sub>3</sub>I to form dimethyl carbonate. For each electrode containing 1.25 mL; 2.5 mL; and 3.75 mL Zn has 63,314%, 16,380%, and 13,379% of products from CO<sub>2</sub> reduction process. Therefore, the optimum condition was obtained using electrode containing 1,25 mL Zn, resulting the most dimethyl carbonate products.