

Pengaruh laju alir dietanolamina (DEA) terhadap absorpsi gas CO₂ dari campurannya dengan CH₄ melalui kontaktor membran superhidrofobik = Effect of diethanolamina (DEA) flow pattern on carbon dioxide absorption from its mixture with CH₄ through superhydrophobic membrane contactor

Ainu Safira Corni, author

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Abstrak

[ABSTRAK

Penelitian ini mengevaluasi kinerja absorpsi gas CO₂ dari campurannya dengan CH₄ melalui membran kontaktor superhidrofobik. Kinerja kontaktor membran superhidrofobik ini ditinjau dari empat parameter utama dengan variasi laju alir pelarut DEA (100, 300 dan 500 mL/menit) dan jumlah serat membran kontaktor (2000 dan 8000). Hasil penelitian ini menunjukkan bahwa kenaikan laju alir pelarut DEA meningkatkan kinerja kontaktor membran superhidrofobik, dalam hal koefisien perpindahan massa, fluks dan efisiensi penyerapan CO₂. Sedangkan kenaikan jumlah serat membran akan menurunkan koefisien perpindahan massa dan fluks CO₂. Namun, meningkatkan efisiensi penyerapan CO₂ dan acid loading. Koefisien perpindahan massa dan fluks CO₂ tertinggi yang didapatkan pada penelitian ini berturut-turut adalah $2,31 \times 10^{-4}$ cm/s dan $7,15 \times 10^{-6}$ mmol/cm²s pada laju alir DEA 500 mL/menit dan jumlah serat membran 2000. Sedangkan efisiensi penyerapan CO₂ tertinggi adalah 72% pada laju alir DEA 500 mL/menit dan jumlah serat membran 8000.

ABSTRACT

This study evaluates performance of CO₂ absorption from its mixture with CH₄ through membran contactor superhydrophobic. Superhydrophobic membrane contactor performance is observed using four main parameters by varying the flow rate of solvent DEA (100, 300 dan 500 mL/min) and the number of fiber membrane contactors (2000 and 8000). The results showed that increasing DEA solvent flow rate increase superhydrophobic membrane contactor performance, in terms of mass transfer coefficient, flux and efficiency removal of CO₂. While increasing the number of fiber membrane will reduce the mass transfer coefficient and CO₂ flux. However, it will increase the efficiency removal of CO₂ and acid loading. The highest mass transfer coefficient and CO₂ flux obtained in this study are respectively $2,31 \times 10^{-4}$ cm/s and $7,15 \times 10^{-6}$ mmol/cm²s on DEA flow rate of 500 mL/min and the number of fiber membranes 2000. The highest CO₂ absorption efficiency is 72% at DEA flow rate of 500 mL/min and the number of fiber membranes 8000.;This study evaluates performance of CO₂ absorption from its mixture with CH₄ through membran contactor superhydrophobic. Superhydrophobic membrane contactor performance is observed using four main parameters by varying the flow

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