

RINGKASAN

Lambert Hotma, Jurusan Teknik Mesin, Fakultas Teknik, Universitas Brawijaya, Juni 2015, *Pengaruh Jumlah Lubang Bubble generator dan Konsentrasi NaOH terhadap kadar CH₄ dan CO₂ pada Purifikasi Bertingkat Sistem Kontinyu*, Dosen Pembimbing : Denny Widhiyanuriyawan dan Nurkholis Hamidi.

Pada zaman ini, banyak dilakukan inovasi – inovasi yang dilakukan dalam mencari sumber energi alternatif. Salah satu contoh energi alternatif yang diperoleh dari pengolahan biomassa adalah biogas. Biogas merupakan bahan bakar organik yang dihasilkan melalui proses respirasi anaerob (fermentasi) dari limbah organik. Akan tetapi, kadar CO₂ dalam biogas menurunkan nilai kalornya sehingga kadar CO₂ harus dikurangi terlebih dahulu.. Dari permasalahan yang timbul akibat penggunaan biogas, maka dilakukan penelitian tentang pemurnian biogas.

Pada penelitian ini akan diuji bagaimana pengaruh variasi jumlah lubang *bubble generator* dan konsentrasi NaOH terhadap efektivitas absorben dalam proses penyerapan CO₂ pada purifikasi gas bertingkat sistem kontinyu. Variabel-variabel yang digunakan dalam penelitian ini pertama variabel bebas berupa jumlah lubang *bubble generator* (10, 20, dan 30), waktu purifikasi gas. (0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, dan 60 menit), dan konsentrasi larutan NaOH sebesar 10%, 20%, dan 30%. Kemudian dilakukan pengukuran bagaimana pengaruh jumlah lubang *bubble generator* dan konsentrasi NaOH terhadap kadar CO₂ dan tekanan gasnya.

Hasil yang didapat setelah pemurnian selama 60 menit, persentase kadar CO₂ terhadap tekanan setelah purifikasi menurun paling banyak pada jumlah lubang *bubble generator* 30 dan konsentrasi NaOH 30%. Hasil pengukuran didapat pada jumlah lubang *bubble generator* 10; NaOH 10% , kadar CO₂ 17,26% dan tekanan 103260 Pa; jumlah lubang *bubble generator* 10 NaOH 20% , kadar CO₂ 13,22% dan tekanan 103040 Pa; jumlah lubang *bubble generator* 10 NaOH 30% , kadar CO₂ 11,58% dan tekanan 102860 Pa; jumlah lubang *bubble generator* 20 NaOH 10% , kadar CO₂ 13,21% dan tekanan 103040 Pa; jumlah lubang *bubble generator* 20 NaOH 20% , kadar CO₂ 11,76% dan tekanan 102940 Pa; jumlah lubang *bubble generator* 20 NaOH 30% , kadar CO₂ 9,05% dan tekanan 102660 Pa; jumlah lubang *bubble generator* 30 NaOH 10% , kadar CO₂ 12,5% dan tekanan 102940 Pa; jumlah lubang *bubble generator* 30 NaOH 20% , kadar CO₂ 9,65% dan tekanan 102820 Pa; jumlah lubang *bubble generator* 30 NaOH 30% , kadar CO₂ 5,87% dan tekanan 102600 Pa.

Kata kunci : Biogas, CO₂, NaOH, *bubble generator*, kadar gas, tekanan gas.

SUMMARY

Lambert Hotma, Department of Mechanical Engineering, Faculty of Engineering, Brawijaya University, June 2015, Effect of number of bubble generator holes and NaOH concentration to the content of CH₄ and CO₂ in the continuous staged purification, Lecturer : Denny Widhiyanuriyawan and Nurkholis Hamidi.

In these days, many innovations are made in looking for alternative energy sources. Example of alternative energy source is biogas. Biogas is organic fuel that produced from anaerob respiration (fermentation) from organic waste. However, CO₂ content in biogas decreases its heating value. From the problem that occurred from application of biogas, then scientists make a research about biogas purification.

There will be tested influence of the number of bubble generator holes and NaOH concentration to the absorbent effectiveness in absorbing CO₂ which system works continuously. Variable that used in this research are number of bubble generator holes (10, 20, and 30), purification time (0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 minutes), and NaOH concentration (10%, 20%, 30%). Then, measurement is done how effect of number of bubble generator holes and NaOH concentration to the CO₂ content and gas pressure.

The results showed that purification for 60 minutes, percentage of CO₂ and pressure after purification decline with the lowest number in the number of bubble generator holes 30 and NaOH concentration 30%. Measurements are shown after purification for 60 minutes with number of bubble generator 10 NaOH 10% CO₂ content 17,26% and pressure 103260 Pa; number of bubble generator 10 NaOH 20% CO₂ content 13,22% and pressure 103040 Pa; number of bubble generator 10 NaOH 30% CO₂ content 11,58% and pressure 102860 Pa; number of bubble generator 20 NaOH 10% CO₂ content 13,21% and pressure 103040 Pa; number of bubble generator 20 NaOH 20% CO₂ content 11,76% and pressure 102940 Pa; number of bubble generator 20 NaOH 30% CO₂ content 9,05% and pressure 102660 Pa; number of bubble generator 30 NaOH 10% CO₂ content 12,5% and pressure 102940 Pa; number of bubble generator 30 NaOH 20% CO₂ content 9,65% and pressure 102820 Pa; number of bubble generator 30 NaOH 30% CO₂ content 5,87% and pressure 102600 Pa.

Keyword : Biogas, CO₂, NaOH, bubble generator, gas content, gas pressure.