

## Peningkatan penyimpanan gas alam dengan karbon aktif berbahan dasar limbah plastik polyethylene terephthalate = Enhancement of methane storage capacity with polyethylene terephthalate plastic waste based activated carbon

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### Abstrak

Indonesia mengimpor BBM Bahan Bakar Minyak dalam jumlah besar. Indonesia memiliki cadangan gas alam dalam bentuk gas alam dalam jumlah besar namun mempunyai kendala dalam proses penyimpanannya. Untuk menghasilkan tempat penyimpanan dengan kondisi yang aman maka dicanangkan teknologi ANG Adsorbed Natural Gas . Pembuatan karbon aktif berbahan dasar PET untuk penyimpanan gas alam menggunakan teknologi ANG dimana teknologi ANG telah banyak diteliti namun masih memiliki beberapa kekurangan. Penelitian ini diawali dengan melakukan persiapan alat dan bahan dengan mengkarakterisasi gas alam dan mencari volume kosong serta melakukan proses degassing. Proses selanjutnya adalah melakukan pengujian adsorpsi dan simulasi CFD.

Pada penelitian didapatkan kapasitas penyimpanan terbesar pada temperatur 27oC dan tekanan 35 bar yang menghasilkan kapasitas penyimpanan sebesar 0,0586 kg/kg. Sedangkan pada proses desorpsi didapatkan efisiensi desorpsi terbesar pada temperature 35oC dengan efisiensi desorpsi sebesar 73,39. Selain itu didapatkan juga persamaan model yang sesuai dengan eksperimen yaitu persamaan model Langmuir. Pada simulasi CFD dapat dilihat kontur tekanan, temperatur dan penerapan dari karbon aktif dimana temperatur dan penyerapan terbesar berada di bagian atas tabung dimana konsentrasi gas terbesar berada.

.....Indonesia imported fuel fuel oil in large quantities. Indonesia has reserves of methane gas in the form of natural gas in large numbers but has obstacles in the process of storage. To produce a storage tank to a safe condition then proclaimed to use ANG Adsorbed Natural Gas technology. Manufacture of activated PET based activated carbon for storage of natural gas where technology has been widely studied, but still has some shortcomings. This study begins by preparing tools and materials such as characterize the natural gas and calculate for the void volume and perform deggasing process. The next step is to test the adsorption and CFD simulations.

In this study it was found that the conditions that produce the best adsorption capacity is at the highest pressure which is 35 bar and the lowest temperature which is 27oC which produces a storage capacity of 0.0586 kg kg. While in the process of desorption, the biggest desorption efficiency is obtained at temperatures of 35oC with desorption efficiency of 73,39. In addition it also obtained a model equations that suitable for the experiment which is Langmuir model equations. In the CFD simulations result we can see the contours of pressure, temperature and storage capacity of activated carbon in which the temperature and the largest adsorption is at the top of the vessel where the largest concentrations of gas are located.