

Intisari

Indonesia memiliki sumber energi fosil yang sangat besar seperti batubara. Hampir seluruh pembangkit listrik dan industri di Indonesia menggunakan bahan baku batubara memberikan dampak buruk bagi alam dan kehidupan manusia. Batubara memiliki limbah berupa *flying ash*, *bottom ash*, gas beracun pada saat pembakaran dan sisa batubara yang tidak terpakai. Limbah batubara tidak terpakai, banyak sekali terdapat di pertambangan yang masih beroperasi, sisa lahan pertambangan, *geoserves* atau laboratorium, pembangkit listrik, sehingga perlu penanganan yang tepat seperti pembuatan briket bio-batubara.

Pada pembuatan briket bio-batubara ini, batubara diproses menggunakan metode pirolisis dan tanpa pirolisis dengan uji skala laboratorium seperti uji proksimat dan laju pembakaran. Proses pirolisis menggunakan suhu 400 °C selama 2 jam dan karbonisasi biomassa tanpa menggunakan parameter suhu dan waktu. Analisis laju pembakaran dengan berat total briket 99,87 gr, dibakar pada suhu pembakaran 400 °C dan menggunakan udara ruang didalam *furnace*.

Dalam penelitian ini, limbah batubara jenis bituminus untuk dibuat briket bio-batubara. Sebelum proses pembriketan, batubara jenis bituminus dicampuran dengan limbah biomassa batang tebu sisa pembakaran lahan dan ampas tebu. Variabel penelitian menggunakan 70 gr, 50 gr limbah batubara dan 15 gr, 30 gr biomassa batang tebu, 5 gr, 10 gr ampas tebu dengan berat total briket 99,87 gr. Briket bio-batubara menggunakan perekat tepung kanji 5 gr, tanah liat 5 gr, tingkat kelembutan setiap bahan briket 50 *mesh* dengan kuat tekan 50 kg/cm².

Hasil optimum analisis proksimat briket bio-batubara tanpa pirolisis TP (70 gr) mengandung kadar air sebesar 4,36%, zat terbang 23,48%, kadar abu 23,64%, karbon terikat 48,10%, nilai kalori sebesar 5.374 kal/gr dan mengalami penurunan massa 38,36 gr selama 30 menit. Sementara itu, analisis laju pembakaran briket bio-batubara dengan proses pirolisis PP (50 gr) 1,93 gr/s dan asap hilang pada menit ke 24. Batubara dengan proses pirolisis dapat menurunkan asap dan penambahan biomassa dapat menaikkan nilai kalori briket bio-batubara.

Kata Kunci: Batubara, Batang tebu sisa pembakaran, Ampas tebu.

Abstract

Indonesia has a very large fossil fuel source such as coal. Almost all Indonesia power plants and industries used coal raw materials that gave bad impact on nature and human life. The coal produced flying ash, bottom ash, poisonous gas at the time of burning and unused coal residue. The coal waste was commonly found in mining operations, remaining mining areas, geoserves or laboratories and power plants, this problem could be solved by producing bio-briquette using the waste coal.

Pirolisis and non pirolisis method were used in this reseach besides proximate analysis and burning rate were also used as the laboratory scale. In pirolisis process used 400 °C temperature during 2 hours and biomass carbonition without temperature parameters and time. The burning rate analysis the total weight of the briquette was 99,87 gr tempe was burnt used 400 °C of burning temperature and air space in the furnace.

This research used the coal waste bituminous coal sort to make bio-briquette . was used in this research, the waste coal was mixed with biomassa sugarcane stems left burning and bagasse before the briquette process. The reseach variable used 70 gr, 50 gr of waste coal and 15 gr,30 gr of sugar cane biomass, 5 gr, 10 gr of bagasse. The total weight of the briquette was 99,87 gr. Bio-coal briquette used tapioca as adhesive, 5 gr of soil clay with 50 mesh size of each material and 50 kg/cm² for the pressure.

Optimum the result of proksimat analysis and compulsion of the non-pyrolisis bio-briquette showed that non-pyrolisis bio-briquette TP (70 gr) contained 4,36% of moisture content, 23,87% flying ash, 23,64% ash content, fixed carbon 48,10%, 5374,87 cal/gr calorific value and the mass was decrease became 38,36 gr during 30 minutes. Meanwhile, the compulsion analysis of pyrolisis bio-briquette PP (50 gr) 1,93 gr/s and showed that smoke disappeared on the 24th minute. The waste coal through pyrolisis process could decrease the smoke and adding biomassa could increase the calorie of bio-coal briquette

Key words: Coal, Burning sugar cane, Bagasse