

Use of Biomass as Co-Fuel in Briquetting of Low-Rank Coal: Strengthen the Energy Supply and Save the Environment

Authors : Mahidin, Yanna Syamsuddin, Samsul Rizal

Abstract : In order to fulfill world energy demand, several efforts have been done to look for new and renewable energy candidates to substitute oil and gas. Biomass is one of new and renewable energy sources, which is abundant in Indonesia. Palm kernel shell is a kind of biomass discharge from palm oil industries as a waste. On the other hand, *Jatropha curcas* that is easy to grow in Indonesia is also a typical energy source either for bio-diesel or biomass. In this study, biomass was used as co-fuel in briquetting of low-rank coal to suppress the release of emission (such as CO, NO_x and SO_x) during coal combustion. Desulfurizer, CaO-base, was also added to ensure the SO_x capture is effectively occurred. Ratio of coal to palm kernel shell (w/w) in the bio-briquette were 50:50, 60:40, 70:30, 80:20 and 90:10, while ratio of calcium to sulfur (Ca/S) in mole/mole were 1:1; 1.25:1; 1.5:1; 1.75:1 and 2:1. The bio-briquette then subjected to physical characterization and combustion test. The results show that the maximum weight loss in the durability measurement was $\pm 6\%$. In addition, the highest stove efficiency for each desulfurizer was observed at the coal/PKS ratio of 90:10 and Ca/S ratio of 1:1 (except for the scallop shell desulfurizer that appeared at two Ca/S ratios; 1.25:1 and 1.5:1, respectively), i.e. 13.8% for the lime; 15.86% for the oyster shell; 14.54% for the scallop shell and 15.84% for the green mussel shell desulfurizers.

Keywords : biomass, low-rank coal, bio-briquette, new and renewable energy, palm kernel shell

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