

Physical characterization and desulfurization of bio-briquette using calcium-based adsorbent

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Abstrak

Combustion of coal and co-combustion of their co-fuel contribute to gas emissions. Among the gas emissions are SO_x, NO_x, CO and CO₂. Introduction of calcium based adsorbent is addressed to absorb SO₂ that release to the atmosphere during the combustion process. Objective of the research is at first to observe the physical characteristics of bio-briquettes as a function of briquette compositions (coal to palm kernel shell ratios) and Ca/S ratios (Ca in adsorbent and S in briquette) using a natural adsorbent (shellfish waste). The second objective is to investigate desulfurization characteristics as a function of Ca/S ratios and desulfurization temperatures at coal to palm kernel shell ratio of 90:10 (wt %). Ratios of coal to palm kernel shell in this study are 90:10, 80:20, 70:30, 60:40 and 50:50; and Ca/S ratios are 1:1, 1.25:1, 1.5:1, 1.75:1 and 2:1. Binding agent used is the mixture of *Jatropha curcas* seeds and starch as much as 10% (wt). It was found that introducing the palm kernel shell and adsorbents in the coal briquette affect the water resistant and compressive strength. The highest water resistance and compressive strength were 5,165 second and 34 kg/cm², respectively. The lowest SO₂ level found in this study was 1 ppm for all Ca/S ratios, except for 1:1.