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Experimental studies on combustion characteristics of oil-palm biomass in fluidized-bed: A heat energy alternative (Article) (Open Access)

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Abstract

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One of the technologies that can be used to meet energy needs is biomass combustion. In this study, the oil palm biomass fuels used were empty fruit bunches, oil palm fibers, oil palm midribs, and palm kernel shells. This research was carried out by a direct combustion method using a fluidized-bed combustor. The purpose of this experiment was to investigate the reaction of kinetics and the mechanism of combustion of oilpalm biomass in fluidized-bed combustor. The characteristics observed in this test were the combustion temperature profile, flue-gas composition, and the composition of the ash-deposit chemical compound. The results of the experiments conducted showed that the best biomass combustion temperature profile was recorded at 2 kg biomass with an air flow rate of 0.9375 m^3/s at 90.1%. The maximum temperature of biomass combustion recorded at biomass 3 kg with an air flow rate of 1.25 m^3/s are 950°C (95%). The higher conversion combustion of biomass was found at biomass condition of 3 kg with an air flow rate of 0.9375 m^3/s. The value of O_2 emissions from biomass combustion shows that it was very small 0.2%. While the highest CO_2 value was recorded at 19.9%. The highest combustion efficiency on FBC found 1 kg of biomass fuel with an air flow rate of 0.0654 m^3/s recorded 94.9%. © 2020 PENERBIT AKADEMIA BARU.

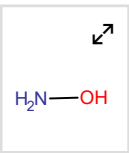
SciVal Topic Prominence

Topic: Fluidized Bed Combustors | Ashes | Gasification

Prominence percentile: 97.939

Chemistry database information

Substances



Author keywords

Ash deposit | Combustion characteristics | Flue gas | Fluidized bed | Oil-palm biomass

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