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Study on improvement of productivity of biomass solid fuel and clinker formation mechanism

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It is well known that the performance and the safety may be hindered because of the clinker formation, when high ash content biomass solid fuel is applied to small scale combustion appliances. In this study, the ultimate goal is to suppress clinker formation of biomass solid fuel. It gives the suggestion that is very important to development and the improvement of the combustion apparatus to arrange clinker formation mechanism of the biomass solid fuel. In this study, new solid biomass fuels, Bio-coke, that can be applied to small scale combustion appliances are manufactured and the clinker formation situation is compared through mixed firing experiments with ordinary pellets. Furthermore, important knowledge considered to help development and the improvement of the combustion apparatus was provided.

Bio-coke that does not cause melting of combustion ash after combustion is also important from the viewpoint of promoting effective utilization of biomass combustion ash. However, a technology for mass-producing bio-coke that can be used in a household compact combustor has not yet been established. As a result of working on improvement of batch type manufacturing process using six-hole molder system for the purpose of improving production capacity of small diameter bio-coke, the following results were obtained. (1) It was found that it is possible to increase the size per unit by 85% by optimizing the initial moisture content. (2) It was found that by shifting the molding process using two molding units, the manufacturing capacity per unit time can be improved by about 50-90%.

Biography

Atsuhiko Kawamura received a doctorate in field of Bio-application and System Engineering from Tokyo University of Agriculture and Technology in 2006, based on the achievement in the industrial world for 20 years. He works at the National Institute of Technology, Koshiro College from 2010 and is a professor from 2014. He conducts a wide range of education and research on energy and the environment, such as biomass energy, renewable energy, energy conversion, high efficiency, engine exhaust control, plant factory etc. He has published over 20 papers in a reputable journal and has been serving as a director of academic society.

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