

The Physicochemical Properties and Thermal Behaviour of Rice Husk for Dust Explosion Study

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Abstract

Combustible dust is present in a great variety of industries. It is estimated there are about 13 million workers in the manufacturing industry and thousands of these may be at risk of injury related to combustible dust. In order to reduce dust explosion in this industry, a study on the physicochemical properties thermal behaviour on explosion characteristic of rice husk is carried out with range size of rice husk is 63 μ m - 355 μ m. Thermal gravimetric analyzer (TGA) which is used to test the present of moisture content, rice husk ash, volatility and fixed carbon shows that the value is 15.55%, 0.17%, 50.19% and 34.05% accordingly. Decreasing of moisture content and increasing of volatile matter were tend to increase the explosion hazard which mean can lead to explosion as the moisture content of a sample may act as a prevention or mitigation factor for dust explosions while high volatile content may increase the maximum rate of pressure rise. Meanwhile, four size of rice husk samples; 63 μ m, 106 μ m, 125 μ m and 355 μ m were analysed along with the elemental identification by scanning electron microscopy with energy dispersive x-ray (SEM-EDX) analysis. The size of the sample may influence the ignition and severity of a combustible dust explosion.

Keywords: Calorific Value; Combustible Dust; Explosion Severity; Rice Husk