DYNAMICS AND TEMPERATURE OF COMBUSTION OF WOOD DUST – AIR MIXTURE IN A QUARTZ TUBE

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Abstract: This study is concerned with combustion dynamics of wood dust of fraction from 50 to 100 µm in fuel-rich mixtures in the channel 90 mm in inner diameter and 1.0 m in height. Two types of stretching the combustion front were registered: linear increase in the height of the paraboloid (it simulates the shape of the flame) during combustion propagation; slowing down of paraboloid height growth followed by its reduction, as a rule, in the second half of the tube. For these types of flame stretching dynamics, the dependencies of the velocity of the combustion front vs. parameter dimensionless paraboloid height are obtained as well as the values of pressure and temperature in the channel. The temperature distributions in the combustion region for four values of channel height at various dust concentrations were obtained. The characteristic dimensions of the combustion zone for mixtures with different content of combustible dust were estimated.

Keywords: dust–air mixture; combustion; fire and explosion hazards; industrial explosions

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References

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