The role of a single solid particle in modifying the combustible mixture flow behind the shock wave front

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The study of the result of the fine dust addition to explosive gas mixtures is of great interest to researchers due to the importance of this issue for the safe operation of various industrial plants, including nuclear power plants. In our early work [1], we numerically showed that there are flow conditions in which even a single solid particle behind the shock wave front in a combustible mixture is able to reduce induction time by an order of magnitude. Then, according to our calculations [2], it was proved that the ignition parameters of the mixtures slightly depend on their composition. In the present paper, we examine the dependencies of the energy values released in the flow and the concentrations of reaction products on the particle size. The work examines hydrodynamic and chemical processes in the flow, whereas the walls of the solid particle are defined as impenetrable for gas and adiabatic for energy.

[1] Efremov V, Obruchkova L, Kiverin A and Ivanov M 2018 *J. Phys.:Conf. Ser.* **946** 012073