NUMERICAL SIMULATION OF SOOT EMISSION REDUCTION AT A DI DIESEL ENGINE

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Abstract: A detailed kinetic modeling of the formation of soot particles during ignition and combustion of a rich n-heptane–air mixture ($\varphi = 3.0$) is carried out under conditions of a diesel combustion chamber. The possibility of a detailed kinetic modeling of the ignition and soot formation processes within the framework of a unified kinetic model is demonstrated. The predictive power of this model is tested for the injection of H_2O_2 and H_2 additives into a rich n-heptane–air mixture. These additives influence both the processes of ignition and soot formation. The kinetic parameters were kept constant in all calculations. A good qualitative agreement between the simulation results and the available experimental data is observed.

Keywords: ignition kinetics; kinetics of soot formation; numerical simulation; spray of burning diesel fuel; hydrogen peroxide additives; soot reduction

Acknowledgments

This work was supported by the Program No. 31P of the Presidium of the Russian Academy of Sciences "Basic Research of Combustion and Explosion."

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Received January 12, 2017

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