

EFFECT OF TRIFLUORIODOMETHANE ADDITIVES ON THE IGNITION OF MULTICOMPONENT COMBUSTIBLE MIXTURES BEHIND SHOCK WAVES*

A. V. Drakon¹, A. V. Eremin², M. R. Korshunova³, and E. Yu. Mikheyeva⁴

Abstract: The problems of improving the safety of various industrial facilities dealing with combustible mixtures are constantly in the center of increased attention. The introduction of chemically active additives into the gas mixture is considered as one of the most effective ways to prevent ignition and explosion. One of the most promising highly effective and, at the same time, environmentally friendly additives is trifluoroiodomethane CF₃I. Recently, the effect of CF₃I on the ignition of acetylene and methane has been studied; however, combustible gas mixtures encountered in practice are often far from pure gases in composition and contain impurities that can significantly affect the ignition kinetics. In this work, an experimental study of the effect of CF₃I on ignition delays behind shock waves of complex combustible mixtures, including mixtures of hydrogen and carbon monoxide (model mixture “synthesis gas”) as well as mixtures of methane with acetylene additives (model mixture “mine gas”) has been carried out. As a result of the experiments, it is shown that in mixtures simulating synthesis gas, CF₃I additives lead to a considerable inhibition of ignition, while in “mine gas,” this effect turned out to be insignificant.

Keywords: ignition; inhibition; trifluoroiodomethane; syngas; mine gas

DOI: 10.30826/CE23160103

EDN: XCSUQT

Acknowledgments

The work was supported by the Ministry of Science and Higher Education of the Russian Federation, agreement No. 075-15-2020-806 dated 09.29.2020.

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*The paper is based on the work that was presented at the 10th International Symposium on Nonequilibrium Processes, Plasma, Combustion, and Atmospheric Phenomena (NEPCAP), October 3–7, 2022, Sochi, Russia.

¹Joint Institute for High Temperatures of the Russian Academy of Sciences, 13-2 Izhorskaya Str., Moscow 125412, Russian Federation; drakon.a.v@gmail.com

²Joint Institute for High Temperatures of the Russian Academy of Sciences, 13-2 Izhorskaya Str., Moscow 125412, Russian Federation; eremin@jiht.ru

³Joint Institute for High Temperatures of the Russian Academy of Sciences, 13-2 Izhorskaya Str., Moscow 125412, Russian Federation; mayya_korshunova_95@mail.ru

⁴Joint Institute for High Temperatures of the Russian Academy of Sciences, 13-2 Izhorskaya Str., Moscow 125412, Russian Federation; ekaterina.mikheyeva@gmail.com

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Received April 15, 2022

Contributors

Drakon Alexander V. (b. 1983) — Candidate of Science in physics and mathematics, senior research scientist, Joint Institute for High Temperatures of the Russian Academy of Sciences, 13-2 Izhorskaya Str., Moscow 125412, Russian Federation; drakon.a.v@gmail.com

Eremin Alexander V. (b. 1946) — Doctor of Science in physics and mathematics, professor, chief research scientist, Joint Institute for High Temperatures of the Russian Academy of Sciences, 13-2 Izhorskaya Str., Moscow 125412, Russian Federation, eremin@jiht.ru

Korshunova Maya R. (b. 1995) — junior research scientist, Joint Institute for High Temperatures of the Russian Academy of Sciences, 13-2 Izhorskaya Str., Moscow 125412, Russian Federation; mayya_korshunova_95@mail.ru

Mikheyeva Ekaterina Yu. (b. 1987) — Candidate of Science in physics and mathematics, senior research scientist, Joint Institute for High Temperatures of the Russian Academy of Sciences, 13-2 Izhorskaya Str., Moscow 125412, Russian Federation; ekaterina.mikheyeva@gmail.com