HEATING AND IGNITION OF PYROTECHNIC COMPOSITIONS BY NEAR-INFRARED LASER RADIATION

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Abstract: The heating and ignition of pyrotechnic compositions $KClO_4/Pb(CNS)_2/PbCrO_4$ and Pb_3O_4/Si by CW lasers in near-infrared range (0.98 and 1.56 μm) with fiber-optic radiation delivery has been investigated. The dynamics of heating and ignition of these materials at different laser radiation power, from 0.1 to 10 W, has been investigated. It has been established that the delay time of ignition depends on the pyrotechnic composition and on the power and wavelength of laser radiation. Composition Pb_3O_4/Si is heated up to ignition 5–8 times faster than $KClO_4/Pb(CNS)_2/PbCrO_4$. Ignition delay time is inversely proportional to the power of the laser radiation with a power exponent of 1.4–1.5. Ignition time at a wavelength of 0.98 μm is 2–3 times shorter.

Keywords: laser heating; laser ignition; pyrotechnic compositions; initiating means; ignition; ignition composition

DOI: 10.30826/CE18110313

Acknowledgments

The work was supported by the Russian Foundation for Basic Research, grant No. 16-29-01072-ofi.

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Received August 6, 2018

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