CONVECTIVE BURNING: FROM EXPLOSION SAFETY TO APPLICATION IN PULSE TECHNICAL DEVICES

B. S. Ermolaev, A. A. Sulimov, A. V. Roman'kov, and V. E. Khrapovskii

N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation

Abstract: Up to date, convective burning was considered taking into account its key role in explosion at accidental ignition of energetic materials. As soon as the threshold conditions of convective burning initiation are exceeded during an accident, transition to destructive detonation becomes inevitable. At the same time, convective burning characteristics turn out to be very attractive for various engineering applications. A series of studies on stabilization and behavior of convective burning fulfilled in the laboratory of explosion processes in condensed materials of ICP RAS enables one to proceed to investigation of operation conditions in pulse technical devices. This paper resumes the results of investigations conducted after 1973. The first part of the paper considers new data on the behavior and mechanisms of convective burning. The second part contains the results of tests demonstrating the possibility of promising applications of convective burning as the operation mode of combustion in pulse barrel and nozzle devices.

Keywords: convective burning; deflagration-to-detonation transition; barrel setup; pulse rocket engine; block charge

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Contributors

Ermolaev Boris S. (b. 1940) — Candidate of Science in physics and mathematics, head of laboratory, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; boris.ermolaev@yahoo.com

Sulimov Alexey A. (b. 1937) — Doctor of Science in physics and mathematics, professor, chief research scientist, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; aasul@chph.ras.ru

Roman'kov Alexander V. (b. 1947) — Candidate of Science in physics and mathematics, senior research scientist, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; romankov@mail.ru

Khrapovskii Vladimir E. (b. 1945) — Candidate of Science in physics and mathematics, senior research scientist, N. N. Semenov Institute of Chemical Physics, Russian Academy of Sciences, 4 Kosygin Str., Moscow 119991, Russian Federation; kgrapovskii@chph.ras.ru