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# Unified mathematical model of ignition and combustion of single particles of aluminum diboride

© P.V. Papyrin, A.V. Sukhov, D.A. Yagodnikov

Bauman Moscow State Technical University, Moscow, 105005, Russia

*The study focuses on the unified mathematical model of ignition and burning of a single particle of aluminum diboride in a gaseous oxidizing medium. It is assumed that particle of aluminum diboride is an alloy of boron and aluminum, wherein the part of the surface occupied by each of the elements is proportional to their mole fraction in the alloy, and on the particle surface on the respective surfaces proportional to the mole fraction of each element in the alloy there occur competing reactions of aluminum and boron oxidation. It is generally thought that between the particle and the environment there occurs radiative and convective heat transfer. The model is based on the experimental dependences of kinetics of oxidation and combustion reactions of single particles of boron and aluminum. In our research we identified the ignition criteria of particles conglomerate and obtained the dependences of ignition induction time and combustion time on the initial values of the ambient temperature and aluminum diboride particle diameter.*

**Keywords:** aluminum diboride, single particle, ignition, combustion, competing reactions, mathematical model

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**Papyrin P.V.** (b. 1991) graduated from Bauman Moscow State Technical University in 2014. Post-graduate student of the Department of Rocket Engines, BMSTU, engineer of the Research Institute of Power Engineering at BMSTU. e-mail: ctpelok91@gmail.com

**Sukhov A.V.** (b. 1937) graduated from Bauman Moscow Higher Technical School in 1961. Dr. Sc. (Eng.), Professor of the Department of Rocket Engines, Bauman Moscow State Technical University. Author of over 150 scientific and educational works and inventions in the field of rocket engines.

**Yagodnikov D.A.** (b. 1961) graduated from Bauman Moscow Higher Technical School in 1984. Dr. Sc. (Eng.), Professor, Head of the Department of Rocket Engines Department, Bauman Moscow State Technical University. Author of over 180 scientific papers in the field of experimental and theoretical studies of working processes and the research of non-contact methods of diagnostics of rocket and jet engines. e-mail: daj@bmstu.ru

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