

Influence of pressure and temperature on burning characteristics of magnesium composition with metal fluorides

© S.V. Shibanov, P.O. Korolev, A.I. Shabunin,
V.I. Sarabjev, M.V. Khrisanfov

Federal Scientific and Production Center “Scientific Research Institute of Applied Chemistry”, Sergiev Posad, Moscow Region, 141313, Russia

The paper describes the influence of pressure and temperature on some parameters of the burning principles of pyrotechnic compositions, which contain magnesium and sodium nitrate with alkaline and transitional metal fluorides. The authors determine temperature coefficients for pyrotechnic compositions with various fluorides additions. They also elaborate equations for the parametrical dependencies of burning rate on pressure and temperature. After analyzing the obtained results, it became possible to define the scope of influence of the initial parameters on burning rate of composition.

Keywords: *pyrotechnic composition, metal fluorides, the pressure and temperature influence, burning principles, temperature coefficient, regression equation.*

Shibanov S.V. (b. 1985) graduated from the Moscow State Industrial University in 2007. A Senior Researcher of the Federal Scientific and Production Center “The Scientific Research Institute of Applied Chemistry”. An author of more than 10 scientific papers on obtaining and applying ultra- and nanodispersive components in energy-saturated systems. e-mail: lab112.niiph@yandex.ru

Korolev P.O. (b. 1991) graduated from the Moscow State Industrial University in 2013. A Designing Engineer of the Federal Scientific and Production Center “The Scientific Research Institute of Applied Chemistry”. Fields of scientific interests include development of solid pyrotechnic compositions and charges for hydroactive and jet engines. e-mail: lab112.niiph@yandex.ru

Shabunin A.I. (b. 1976) graduated from the Tula State University in 2000. Ph.D., Head of the Laboratory of the Federal Scientific and Production Center “The Scientific Research Institute of Applied Chemistry”. An author of more than 25 scientific papers on the development of solid pyrotechnic compositions and charges for hydroactive and jet engines. e-mail: lab112.niiph@yandex.ru

Sarabjev V.I. (b. 1947) graduated from the Kazan Chemical and Technological Institute named after S.M. Kirov in 1972. Dr. Sci. (Eng.), Professor, Head of the Department of the Federal Scientific and Production Center “The Scientific Research Institute of Applied Chemistry”, Chief Designer of the project. An author of more than 250 scientific papers on obtaining and applying ultra- and nanodispersive components in energy-saturated systems, e-mail: lab112.niiph@yandex.ru

Khrisanfov M.V. (b. 1990) graduated from the Moscow State Industrial University in 2012. A Designing Engineer of the Federal Scientific and Production Center “The Scientific Research Institute of Applied Chemistry”. Field of scientific interests includes development of solid pyrotechnic compositions and charges for hydroactive and jet engines, e-mail: lab112.niiph@yandex.ru