COMPOSITION OF PASTY PROPELLANTS AND SPECIFIC FEATURES OF THEIR BURNING

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Abstract: Paste propellant propulsion is a possible alternative to the commonly used liquid and solid propellant propulsion. However, information on the burning process of pasty condensed systems remains very limited. The paper presents the results of experimental study of the burning process of pasty condensed systems at varying their composition. The study deals with determining the parameters of the burning rate law and the characteristics of the agglomeration process. The description of the research methodology is provided. Paste compositions have been identified that provide control of the burning process of pasty propellants which includes changing the law of burning rate and agglomeration characteristics. A significant role of the intermediate structure — skeleton layer — in the burning process of the system under consideration has been established. The obtained data made it possible to reveal a general physical mechanism of the burning process of pasty propellants.

Keywords: pasty condensed systems; paste composition; skeleton layer; agglomerate; burning rate; burning rate law

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Figure Captions

Figure 1 Propellant burning rate vs. pressure

Figure 2 Dependences of parameters $Z_m^a(P)$ (*a*), $\eta(P)$ (*b*), and $D_{43}(P)$ (*c*) on pressure

Figure 3 Mass functions of the size distribution density of agglomerates for composition Bas_1: *1* — high density; and *2* — low density

Figure 4 Schematic of the burning zone

Table Captions

Table 1 Characteristics of paste compositions

Table 2 Characteristics of the propellant structure

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