

INITIATING ABILITY OF SALTS OF 5,5'-AZOTETRAZOLE AND THEIR MIXTURES WITH OXIDANTS

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Abstract: The AzT salts are interesting as perspective oxygen-free, high-enthalpy, and low-sensitivity components of energetic compositions. The possibility of deflagration-to-detonation transition in salts of 5,5'-azotetrazole with the nitrogenous bases (hydrazine, hydroxylamine, and triaminoguanidine) is investigated. It is shown that in the copper tubes in enclosed and semienclosed volume, combustion of salts of 5,5'-azotetrazole of hydrazine and triaminoguanidine transitions to the convective burning regime without transition to detonation. These salts do not exhibit the initiating ability for PETN. Only the salt of 5,5'-azotetrazole with hydroxylamine exhibit such an initiating ability, for which the minimum initiating charge for TNT is determined. The possibility of deflagration-to-detonation transition and initiating ability of the coprecipitated stoichiometric mixtures of salts of 5,5'-azotetrazole with triaminoguanidine and ammonia with oxidizers (chlorate and potassium perchlorate) have been investigated. It is shown that in the copper tubes, in these mixtures, there is a transition to convective burning regime without transition to detonation as in previously investigated individual salts. In contrast to the individual salts of 5,5'-azotetrazole, mixtures of salts of 5,5'-azotetrazole with triaminoguanidine and ammonia with potassium chlorate exhibit an initiating ability for PETN.

Keywords: salts of 5,5'-azotetrazole with nitrogenous bases; mixtures with oxidants; transition of combustion to convective burning regime; deflagration-to-detonation transition; initiating ability

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Figure Captions

Figure 1 Schematic of experimental assembling for determining the minimum initiating charge: 1 — steel plate-witness; 2 — copper tube, $l = 5$ cm, $d = 8 \times 1$ mm; 3 — electric igniter; 4 — initiating explosive; 5 — blasting explosive; 6 — sealant; L — length of the charge of the initiating explosive; and L' — length of the blasting explosive charge

Figure 2 The appearance of the assembling and the results of determining the minimum initiating charge (the direction of initiation is indicated by arrows)

Figure 3 The appearance of the assembling and the results of the study of deflagration-to-detonation transition (the direction of ignition is indicated by arrows)

Figure 4 The results of determining the initiating ability (assembling according to Fig. 1, the direction of initiation is indicated by arrows): mixtures of $(\text{NH}_4)_2\text{AzT}$ (a) and TAG_2AzT (b) with oxidizers according to PETN (on the left — with potassium chlorate and on the right — with potassium perchlorate)

Table Caption

Combustion characteristics of AzT salts and their stoichiometric mixtures with different oxidizers [12, 14]

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