BEHAVIOR OF FURAZANO[3,4-e]TETRAZINE-4,6-DI-N-OXIDE CRYSTALS DURING LONG-TERM STORAGE. DENSITY AS AN INDICATOR OF THERMAL STABILITY

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Abstract: The specific features of density changes during long-time storage have been studied for the high-energy compound furazano[3,4-e]tetrazine-4,6-di-N-oxide by means of the bottle method, powder X-ray diffraction, and IR spectroscopy. It is shown that at an initial stage, pending about 14 days, the density increase occurs owing to recrystallization. At the further storage within 8 years, the density gradually falls owing to increase of the crystal lattice strain created by products of thermal decomposition. At 22 °C, for 8 years, the depth of decomposition estimated by extrapolation of Arrhenius dependence is equal to 0.24%. The density reduction is explained by an anomalously low decelerating effect of a crystal lattice. The conclusion is drawn that the study of the density change at a long-time storage provides valuable information on stability of high-energy compounds and the nature of the physical and chemical processes occurring during aging under normal conditions.

Keywords: high-energy compounds; stability; furazano[3,4-e]tetrazine-4,6-di-N-oxide; kinetics; IR-spectroscopy; X-ray diffraction

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