DETERMINATION OF KINETIC CHARACTERISTICS OF MELAMINE MOLECULES USING THE VOLTAGE NODULATION METHOD

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Non-stationary surface ionization (SI) is used to determine the kinetic properties of desorption of particles [1]. This study focuses on determining the kinetic characteristics of the melamine (C3H6N6) molecule using a voltage modulation method (VMM). The melamine molecule is an organic compound with a 1,3,5-triazine structure and serves to increase the strength of materials in the production of food containers in industry. When food products are exposed to high temperatures, this substance partially decomposes and can accumulate in the human body, posing potential health risks. Therefore, studying this compound using the SI method is of significant interest.

The experiments were conducted using an MИ-1201В static magnetic mass spectrometer modified for the SI method. Oxidized tungsten tape was used as a thermoemettr (0.05 x 1.0 x 16 mm3). The VMM system was developed and integrated into ionization chamber. The kinetic characteristics of the molecules under study, including the blocking voltage regulated by the ion capture time, were monitored using a signal with a delay of no more than 10⁻⁵ s [2].

First, melamine was studied under stationary SI conditions. The SI mass spectrum consisted of M+ and [M-R]+ ion lines. Using the VMM method the rate constants К+ and К0, activation energy Е+ and Е0 of thermal desorption were determined. Additionally, entropy multipliers for both ions and neutral particles of [M-R]+, were calculated. The ionization potentials of these radicals were estimated, as well as heat of sublimation of melamine molecules.

References

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