Thematic Section: Physicochemical Research. **Full Paper**
Subsection: Physical Organic Chemistry. *Reference Object Identifier* – ROI: jbc-02/17-52-12-19
Publication is available for discussion in the framework of the on-line Internet conference "*Butlerov readings*".
http://butlerov.com/readings/
The article is published based on the materials of the 1st stage of the Mini-Symposium "Butlerov Heritage – 17-18" (Samara)
Submitted on December 05, 2017.

Conductometric and refractometric studies of water-acetonitrile solutions of 1,2,4-triazine and 1,2,4-triazole derivatives

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Keywords: electric conductivity, molar refraction, water-acetonitrile solution, nitrogen heterocycles, 1,2,4-triazine and 1,2,4-triazole derivatives.

Abstract

The results of conductometric and refractometric studies of water-acetonitrile solutions of some aromatic heterocycles are presented. A wide application of the water-acetonitrile mixture in chemical practice as a solvent and extractant was noted, as well as an eluent in liquid chromatography. It is shown that recent publications indicate that in the reversed-phase version of liquid chromatography, the variation of the quantitative ratio of acetonitrile to water in such a mixture allows not only to achieve a good separation of the components of the mixtures being analyzed, but also to study the processes occurring when dissolving organic compounds of different structures in such solvent. Using the IR and NMR spectroscopy methods, many authors have shown the existence of homo- and heteroassociates of water and acetonitrile in their mixtures, leading to various kinds of deviations in the dependence of the physico-chemical characteristics of solutions on their composition. It is noted that in connection with the probability of such processes occurring in solution, it becomes necessary to take into account the corresponding changes in the chromatography of organic compounds under reversed-phase high-performance liquid chromatography using a water-acetonitrile mixture as the eluent. Earlier in the works of the authors, a nonmonotonic change in the pH and electrical conductivity of water-acetonitrile solutions of certain azoles and quinoline derivatives was detected, as well as the presence of extremums and inflection points on the graphs of the dependence of these characteristics on the composition of the solution, and the next stage of the study was the investigation of aqueous acetonitrile solutions of the derivatives 1,2,4-triazine and 1,2,4-triazole containing three nitrogen atoms in the heterocycle and thus capable of interacting with the components of the water-acetonitrile mixture. The aim of the work was to study the features of water-acetonitrile solutions of these compounds by refractometry and conductometry.

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