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Construction of a packaging system for dispensing of certified reference materials of ethanol in aqueous solution into individual units

Authors Piotr Janko - Central Office of Measures (Główny Urząd Miar)

Abstract

The article presents the construction of a stand for bottling of aqueous ethanol solutions, which are liquid standards for calibration of breath analyzers (including certified reference materials) prepared at the Thermodynamics Laboratory. The stand ensures compensation of ethanol losses to the headspace and provides continuous mixing of the solution during its pouring into individual units (bottles) in order to ensure between bottles homogeneity. The construction of the system is part of the of the EMPIR 16RPT02 ALCOREF project.

Bibliography

- [1] PN-EN ISO 17034:2017-03 Ogólne wymagania dotyczące kompetencji producentów materiałów odniesienia.
- [2] ISO Guide 30:2015 Reference materials - Selected terms and definitions.
- [3] ISO Guide 31:2015 Reference materials - Contents of certificates, labels and accompanying documentation.
- [4] ISO Guide 35:2017 Reference materials - Guidance for characterization and assessment of homogeneity and stability.
- [5] PKN-ISO/IEC Guide 99:2010 Międzynarodowy słownik metrologii - Pojęcia podstawowe i ogólne oraz terminy z nimi związane (VIM).
- [6] K. M. Dubowski. Breath-Alcohol Simulators: Scientific Basis and Actual Performance, *J. Anal. Toxicol.*, 1979, 3 (5), s. 177-182
- [7] OIML R126:2012 Evidential Breath Analysers.
- [8] P. Janko, R. Kordulasiński, J. Wasilewska, E. Lenard: Wodne roztwory etanolu do wzorcowania analizatorów wydechu sporządzane metodą wagową. *Biuletyn GUM* nr (3-4)/2017.
- [9] S. Yu. Noskov, G. Lamoureux, B. Roux: Molecular Dynamics Study of Hydration in Ethanol-Water Mixtures Using a Polarizable Force Field. *J. Phys. Chem. B*, 2005, vol. 109 (14), p. 6705-6713

- [10] L. Saiz, J. A. Padró, E. Guardia: Dynamics and hydrogen bonding in liquid ethanol. *Mol. Phys.*, 1999, 97(7), p. 897-905
- [11] M. Umer, W. A. Kopp, K. Leonhard Efficient yet accurate approximations for ab initio calculations of alcohol cluster thermochemistry. *J. Chem. Phys.*, 2015, 143 (21), p. 2143.
- [12] T. A. Dolenko i in. Raman Spectroscopy of Water-Ethanol Solutions: The Estimation of Hydrogen Bonding Energy and the Appearance of Clathrate-like Structures in Solutions. *J. Phys. Chem. A*, 2015, 119(44), p. 10806-10815
- [13] S. Stehle i A. S. Braeuer. Hydrogen Bond Networks in Binary Mixtures of Water and Organic Solvents. *J. Phys. Chem. B*, 2019, 123, p. 4425-4433
- [14] X. Li, X. Wang, M. dell'Arco Passaro, N. Spinelli, i B. Apicella. Insights on Clusters Formation Mechanism by Time of Flight Mass Spectrometry. 1. The Case of Ethanol-Water Clusters. *J. Am. Soc. Mass Spectrom*, 2015, 26(10), p. 1665-1675.
- [15] S. Alavi, R. Ohmura, i J. A. Ripmeester. A molecular dynamics study of ethanol-water hydrogen bonding in binary structure I clathrate hydrate with CO₂. *J. Chem. Phys.*, 2011, 134(5), 054702.
- [16] K. Egashira, N. Nishi: Low-Frequency Raman Spectroscopy of Ethanol-Water Binary Solution: Evidence for Self-Association of Solute and Solvent Molecules. *J. Phys. Chem. B*, 1998, 102(21), p. 4054-4057.
- [17] N. Nishi i in: Hydrogen-Bonded Cluster Formation and Hydrophobic Solute Association in Aqueous Solutions of Ethanol. *J. Phys. Chem.*, 1995, 99(1), p. 462-468.
- [18] S. Banerjee, R. Ghosh, B. Bagchi: Structural Transformations, Composition Anomalies and a Dramatic Collapse of Linear Polymer Chains in Dilute Ethanol-Water Mixtures. *J. Phys. Chem. B*, 2012, 116(12), p. 3713-3722
- [19] P. Janko, R. Kordulasiński, J. Wasilewska, E. Lenard: Wzorcowanie analizatorów wydechu za pomocą wytwarzanych in situ wilgotnych wzorców gazowych. *Biuletyn GUM nr 2/2018*.
- [20] IW2-EBA Instrukcja wzorcowania. Przygotowanie wodnych roztworów wzorcowych etanolu do wzorcownia analizatorów wydechu, GUM 2017.
- [21] IP1-EBA Instrukcja Postępowania przy wytwarzaniu i certyfikowaniu materiałów odniesienia etanolu w roztworze wodnym. GUM 2019.

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