

Quality control of technical enriched anthracene for phenanthrene

© Marat A. Dyukin,¹ Raphael A. Yusupov,² Sait A. Bakhteev,² and Valery N. Emelyanov¹
¹ Joint-stock Company Federal Research and Production Center

"Research Institute of Applied Chemistry". Academician Silin St., 3. Sergiev Posad, 141313. Russia.

² Department of Analytical Chemistry of Certification and Quality Management. Kazan National Research Technological University. K. Marx St., 68. Kazan, 420012. Republic of Tatarstan. Russia.

Phone: +7 (843) 231-89-10. E-mail: yusupovraf@yandex.ru

*Supervising author; †Corresponding author

Keywords: analysis technique, gas chromatography-mass spectrometry, anthracene, phenanthrene.

Abstract

The proposed method of determination of impurities of phenanthrene to anthracene by GC/MS, using as solvents acetone and benzene. Determined metrological characteristics. Quantitative determination of impurities of phenanthrene in the sample enriched with anthracene. The comparison of the results obtained using as solvents acetone and benzene. The analysis was based on gas chromatography-mass spectrometer GCMS-QP2010 Ultra (Shimadzu Corporation, Japan). The proposed method for quantitative determination of impurities in technical phenanthrene enriched anthracene. The applicability of the method of gas chromatography-mass spectrometry for quality control of industrial designs anthracene. A comparison of methods using different solvents. According to the obtained metrological characteristics it is concluded that the solvent in the proposed method of analysis is preferable to use benzene since the same limiting value of the uncertainty of the result of analysis ($r = 20\%$), the method using benzene guarantees a wider range of determined concentrations, which is associated with higher volatility of acetone compared to benzene, which leads to loss of sample. It is shown that the normalization of the calibration function for the peak naftothofene not required. In the future it is necessary to compare the efficiency, selectivity and quick testing were described in this paper methods and techniques based on the method of additives. Calibration functions are calculated using METROLOGY software developed at the Department of AHCMC KNRTU Professor Yusupov R. A. the criteria for the metrological study of measurement used: the number of reference samples – L; reliability analysis result – R; operating range – Cmin Cmax coefficients of the equation of the linear regression A, b, and their relative standard deviations Sa, Sb; the limiting value of the uncertainty analysis result in the relative view – r.

References

- [1] M.A. Dyukin, I.A. Abdullin, S.A. Bakhteev, R.A. Yusupov. Chromatographic determination of phenanthrene in technical enriched anthracene. *Bulletin of the Kazan Technological University*. **2017**. Vol.20. No.6. P.32-36. (russian)
- [2] F.F. Kadyrov, S.A. Bakhteev, R.A. Yusupov, M.F. Shaehov. Development of a technique for Ti(IV) analysis in aqueous media and biological objects by the XRF method in the low concentration region. *Bulletin of the Kazan Technological University*. **2013**. Vol.16. No.5. P.148-149. (russian)
- [3] A.G. Kirillova, S.G. Smerdova, S.A. Bakhteev, R.A. Yusupov. Estimation of the range of determination of mercury in aqueous solutions by the XRF method on the S2 PICOFOX device. *Bulletin of the Kazan Technological University*. **2013**. Vol.16. No.9. P.54-56. (russian)
- [4] F.F. Kadyrov, S.A. Bakhteev, R.A. Yusupov, M.F. Shaehov. Development of methods for the analysis of Cr(VI) in aqueous media and biological objects by the XRF method. *Bulletin of the Kazan Technological University*. **2013**. Vol.16. No.17. P.172-173. (russian)