A CALORIMETRIC STUDY OF PYRIDINE-FUNCTIONALIZED VINYLBENZYL CHLORIDE AND DIVINYLBENZENE COPOLYMER

Zarubin D.M., Markin A.V., Abarbanel N.V.,
Smirnova N.N., Vorotyntsev A.V., Petukhov A.N.
Lobachevsky State University of Nizhny Novgorod
603022, Nizhny Novgorod, Gagarin Avenue, 23

The unique combination of porous polymer materials properties determines their high potential for application in the analysis of gas mixtures, complex mixtures of non-polar and highly polar compounds, impurities in aqueous solutions, the concentration of trace impurities from air and water, etc. A significant expansion of the polymer materials specificity can be realized by introducing various functional groups into their composition. There are numerous works demonstrating the efficiency of the functionalization of vinylbenzyl chloride and divinylbenzene copolymer for use in various applications, however, important information on a comprehensive study of their thermodynamic properties is lacking.

In the present work, the temperature dependence of heat capacity of the pyridine-functionalized vinylbenzyl chloride and divinylbenzene copolymer were determined in the temperature range from 6 to 350 K by precision adiabatic vacuum calorimetry (BCT–3, Termis, Russian Federation). The thermophysical characteristics of the copolymer were determined in the range 290-570 K by differential scanning calorimetry (DSC 204 F1 Phoenix, Netzsch–Gerätebau, Germany). Based on the obtained experimental data the standard thermodynamic functions, namely, the heat capacity $C_p°(T)$, the enthalpy $[H°(T)-H°(0)]$, the entropy $[S°(T)-S°(0)]$, and the Gibbs energy $[G°(T)-H°(0)]$ were determined in the range from $T \to 0$ to 350 K. The standard thermodynamic characteristics of the pyridine-functionalized copolymer were compared with those for the previously studied [1] initial divinylbenzene and vinylbenzyl chloride copolymer.

1. Abarbanel N.V., Zarubin D.M., Smirnova N.N., Markin A.V., et al. Thermodynamic properties of vinylbenzyl chloride and divinylbenzene copolymer // J. Therm. Anal. Calorim. 2026. In press.

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