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Enthalpies of vaporization of alkylbiphenyls

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Abstract

Alkylbiphenyls are bicyclic aromatic compounds that find ever increasing applications in technology and medicine as liquid crystals, semiconducting nonamaterials and drugs. The thermochemistry of aromatic hydrocarbons derivatives is of general interest, but thermodynamic data of alkylbiphenyls are scarce. Thus, the present study is closing gaps in the experimental thermochemical data of these substances. Enthalpies of vaporization, $\Delta_{cr}^{g} H_{m}^{o}$ were determined for two substances: 4-methylbiphenyl and 4,4'-dimethyl-biphenyl. Measurements were performed on an isothermal heat conducting Calvet microcalo-rimeter according to the standard procedure with an estimated accuracy of ≤ 1.5 per cent. The average values of the standard enthalpies vaporization were adjusted to 298.15 K. These experimental data are of significant interest for calculation of the standard formation enthalpies in the gaseous state. A second-order group additive method has been applied to predict the vaporization enthalpies of some cyclic compounds. The contributions of *tert*-butyl and methyl group to the vaporization enthalpies of the aromatic hydrocarbons derivatives are estimated and aimed at either prediction of properties of substances.