

Accepted Manuscript

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PII: S0040-6031(17)30326-X
DOI: <https://doi.org/10.1016/j.tca.2017.12.016>
Reference: TCA 77898

To appear in: *Thermochimica Acta*

Received date: 9-7-2017
Revised date: 9-12-2017
Accepted date: 12-12-2017

Please cite this article as: Mikhail A.Varfolomeev, Mikhail A.Stolov, Ruslan N.Nagrimanov, Ilnaz T.Rakipov, William E.Acree, Michael H.Abraham, Analysis of Solute-Pyridine Intermolecular Interactions Based on Experimental Enthalpies of Solution and Enthalpies of Solvation of Solutes Dissolved in Pyridine, *Thermochimica Acta* <https://doi.org/10.1016/j.tca.2017.12.016>

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Analysis of Solute-Pyridine Intermolecular Interactions Based on Experimental Enthalpies of Solution and Enthalpies of Solvation of Solutes Dissolved in Pyridine

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Highlights

- Enthalpies of solution at infinite dilution of 21 solutes in pyridine were measured.
- Enthalpies of solvation of 101 solutes in pyridine were determined.
- Multi-parameter correlations for prediction enthalpies of solvation in pyridine were obtained.
- Gibbs energies and enthalpies of hydrogen bonding of solutes in pyridine were calculated.

Abstract

In present work thermochemistry of solvation of inert gases and organic solutes in pyridine was thoroughly studied using solution calorimetry technique. Enthalpies of solution at infinite dilution of 21 organic solutes were determined experimentally at 298.15 K. Measured and literature data were analyzed using Acree and Abraham multi-parameter correlations for description of enthalpies of solvation. Both hydrogen bonding enthalpies between solute and pyridine in bulk pyridine and Gibbs energies of 1:1 complexation between solute with pyridine in inert solvent media were calculated using solute and solvent descriptors. Obtained results are in good agreement with values calculated by previously proposed methods.

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