

Best Paper for the 2nd WSEAS Int. Conf. on COMPUTATIONAL CHEMISTRY (COMPUCHEM'08)
Puerto De La Cruz, Canary Islands, Spain, December 15-17, 2008

Empirical method for calculation properties of organic substances and chemical similarity recognition

Yu. E. ZEVATSKII, D. V. SAMOILOV

*St. Petersburg State Technological Institute (Technical University)
Department of Analytical Chemistry, St Petersburg 198026, Russia*

Abstract

Empirical method for pK(a) prediction based on LFER, experimental solvent properties and atomic contributions shows good accuracy and universality. Values of involved empirical parameters make possible to discriminate organic acids by type of the protonation centre.

Keywords: Empirical method; Atomic contributions; pK(a); Properties estimation; Chemical similarity

References

1. BROWN TN. Computational determination of aqueous pK(a) values of protonated benzimidazoles (part 1). *Journal of Physical Chemistry B* 110:9270 DOI 10.1021/jp055084i 2006
2. CHAUDRY UA. Estimation of pK(a) using quantum topological molecular similarity descriptors: Application to carboxylic acids, anilines and phenols. *Journal of Organic Chemistry* 69:233 DOI 10.1021/jo0347415 2004
3. JANTSCHI L. Results from the use of molecular descriptors family on structure property/activity relationships. *International Journal of Molecular Sciences* 8:189 2007
4. JOVER J. Neural network based QSPR study for predicting pK(a) of phenols in different solvents. *Qsar & Combinatorial Science* 26:385 DOI 10.1002/qsar.200610088 2007
5. JUN H. J PHYS CHEM A 110:257 2006
6. KELLY CP. Adding explicit solvent molecules to continuum solvent calculations for the calculation of aqueous acid dissociation constants. *Journal of Physical Chemistry A* 110:2493 DOI 10.1021/j055336f 2006
7. KROL M. Macroscopic pK(a) calculations for fluorescein and its derivatives. *Journal of Chemical Theory and Computation* 2:1520 DOI 10.1021/ct600235y 2006
8. LIPTAK MD. Absolute pK(a) determinations for substituted phenols. *Journal of the American Chemical Society* 124:6421 2002
9. MAKOWSKA J. Ab initio studies on acid-base equilibria of substituted phenols. *Journal of Physical Chemistry A* 108:10354 DOI 10.1021/jp046990i 2004
10. SCHUURMANN G. Modelling pK(a) of carboxylic acids and chlorinated phenols. *Quantitative Structure-Activity Relationships* 15:121 1996
11. STAIRS RA. Principal component analysis of solvent effects on equilibria and kinetics - A hemisphere model. *Canadian Journal of Chemistry-Revue Canadienne de Chimie* 84:1580 DOI 10.1139/V06-160 2006
12. ULANDER J. Use of empirical correction terms in calculating ionization constants. *International Journal of Quantum Chemistry* 105:866 DOI 10.1002/qua.20683 2005
13. VATANI A. Prediction of standard enthalpy of formation by a QSPR model. *International Journal of Molecular Sciences* 8:407 2007
14. YU E. RUSSIAN J APPL CHEM 80:230 2007
15. YU E. RUSSIAN J APPL CHEM 79:967 2006
16. YU E. RUSSIAN J GEN CHEM 77:234 2007
17. YU E. RUSSIAN J O IN PRESS 44: 2008
18. YU E. RUSSIAN J ORGANIC CH 44:52 2008