INTERACTIONS BETWEEN SEVERAL AMINOPHOSPHONIC ACIDS AND UREA IN WATER AT 298.15 K

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Aminophosphonic acids are an important class of simple mimetics of natural aminoacids. These compounds differ in carboxylic and phosphonic group. The core of aminophosphonate molecule contains a constant NH_2-CH_2-PO_3H_2 group and the core of amino acids is NH_2-CH-COOH. Side substituent –R shows various affinities to water and is partly responsible for hydrofobic –hydrofilic properties.

As a result of the structural analogy of these two classes of amino acids, aminophosphonates exhibit significant biochemical activity, displayed spectacularly in agrochemistry and pharmacology field. Their variety applications include enzyme inhibitors, antibiotics, herbicydes, and also antitumor agents.

Thus it is interesting to research interaction between these compounds and constituent organisms fluids, for example urea. In these studies solution enthalpies of

series aminophosphonic acids (phosphonophenylglycine, phosphonovaline and phosphononorvaline) in water and aqueous urea in 298.15 K have been measured. (Modified McMillan-Mayer theory allows use these data to calculate enthalpic heterogenous pair interaction coefficients of aminophosphonic acids – urea.)

The obtained results let us to calculate the heterogeneous enthalpic pair interaction coefficients between aminophosphonic acids and urea molecule based on McMillan Mayer theory. The enthalpic pair interaction coefficients describe the energetic effects of interactions between aminophosphonic acids molecules and urea molecule what happen in the presence of the competitive participation of water molecules. These values were interpreted in the terms of the hydrophobic effect of the side chains of aminophosphonic acids on their interactions with a molecule of urea in water.