

The effect of solvents on processes of dissociation of phthalic acids and their sodium salts

Autorzy

Kinga Chotnicka

Zdzisław Kinart

Aleksander Filarowski

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The dissociation of the nitrophthalic and pyromellitic acids and their salts in a wide range of solvents has been examined by conductometric measurements. The measurements have been accomplished in the function of the hydrogen bond acceptor (HBA) and dipolar abilities of the solvents. The studies are based on the dissociation constant and Gibbs energy describing the dissociation of acids and salts under the impact of the external electric field. As for the studied acids, the dissociation energy and the dissociation constant values correlate with the SB solvatochromic parameter, which describes the influence of the HBA solvents on solute. The $\Delta G_D(\text{acid})/K_D(\text{acid}) = f(\text{SB})$ correlations show a violent change in the strong HBA solvents. The observed increase and then the decrease of $K_D(\text{acid})$ under increasing SB values point out that the dissociation strongly depends on the enhancement of the solvent-solute interactions. As for the studied sodium salts, the $\Delta G_D(\text{salt})/K_D(\text{salt}) = f(\text{SdP})$ correlations indicate the influence of the dipolar ability of solvents on the salts' dissociation. Initially, the increase of the dipolar ability of solvents leads to weakening of the salts' dissociation, then a further increase of the dipolar ability solvents evokes an abrupt increase of the dissociation. The results reveal a difference of the solvents influence on the dissociation of acids and salts. In the case of the acids the increase of the HBA solvents enhances the acids' dissociation, and then weakens it, whereas for the salts the increase of the solvent dipolarity initially results in weakening of the salts' dissociation, and then its strengthening.

Słowa kluczowe

Phthalic and pyromellitic acids, Hydrogen bond, Dissociation, Solvatochromism

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