Abstract

The monomer-dimer self-association of 2-acetylpyrrole in n-heptane, 2-acetylpyrrole in chloroform and N-ethylacetamide in chloroform had been studied using FTIR spectroscopy. The spectral band of the NH fundamental stretching for free monomer and NH···OC for hydrogen-bonded dimer were resolved and their respective integrated absorbance were calculated. The molar absorptivities of monomer bands ,ε_m, and the dimerization constant K were determined via a plot of $\frac{[S]_0}{A_m}$ against A_m based on a linear equation: $\frac{[S]_0}{A_m} = \frac{1}{\varepsilon_m b} + \frac{2K}{\varepsilon_m{}^2 b^2} A_m$, where A_m is the integrated absorbance of monomer, $[S]_0$ is initial concentration of the solution, b is the path length of salt. The integrated absorbance of the dimer bands for NH···OC were used to determine the molar adsorptivities of the dimer bands. The molar adsorptivities of dimer bands ,ε_d, and the dimerization constant K were determined via a plot of $\frac{2A_d}{[S]_0}$ against $\frac{(A_d)^{1/2}}{[S]_0}$ based on a linear equation: $2\frac{A_d}{[S]_0} = \varepsilon_d b - \left(\frac{\varepsilon_d b}{K}\right)^{1/2} \frac{(A_d)^{1/2}}{[S]_0}$ where A_m is the integrated absorbance of dimer, $[S]_0$ is initial concentration of the solution, b is the path length of salt. The standard enthalpy and entropy of dimerization in each solvent were determined via a van't Hoff plot.