

Absorption characteristics of fullerene C₆₀ in N-methyl-2-pyrrolidone/toluene mixture

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Solutions of fullerene C₆₀ in nitrogen-containing solvents and mixtures are characterized by the evolution of their UV-Vis, IR and Raman spectra in time. They also exhibit sharp solvatochromic effects under slight variations of fullerene concentration or solvent mixture content. Two main processes, namely the formation of C₆₀ clusters and change in the solute-solvent interaction, contribute to these phenomena [1,2]. To clarify the role of the second factor, UV-Vis spectra of fullerene C₆₀ in various mixtures of polar N-methyl-2-pyrrolidone (NMP), $\epsilon = 32$, and non-polar toluene, $\epsilon = 2.4$, are analyzed in this work. Previously, temporal solvatochromism was studied for C₆₀/NMP [3]. Also, changes in UV-Vis spectra with an increase in the absorbance at 450-550 nm took place on addition of polar solvent (water, $\epsilon = 81$, miscible with NMP) to the system [4, 5]. Here, the solvatochromic effect accompanied with a hypsochromic shift of the absorption peak at 330 nm towards higher energy is observed after dissolution of C₆₀/NMP system with toluene. The detailed comparison of the absorption characteristics of C₆₀ in two kinds of mixtures (NMP/toluene and NMP/water) prepared in different ways is presented.

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