

Molecular self-assembling of chiral and racemic butan-2-ol in carbon tetrachloride solutions.

Autorzy

M. Iwahashi
M. Ikumi
H. Matsuzawa
Y. Moroi
Mirosław A. Czarnecki
Yukihiro Ozaki

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The self-association of (*R*)-, (*S*)- and (*RS*)-butan-2-ol in their carbon tetrachloride solutions was studied through the mid-infrared (mid-IR) and near-infrared (NIR) spectroscopic observations. The mid-IR and NIR spectra for each chiral butan-2-ol were compared with those for the racemic (*RS*)-butan-2-ol. Although it has been reported that the hydrogen bonding among the chiral butan-2-ol molecules was stronger than that among the racemic ones, any distinguishable differences between the chiral and the racemic butan-2-ol in CCl₄ solution or even in their pure liquid state were not observed both in their mid-IR and NIR spectra. A superior analytical method, assuming a successive association process for the alcohol molecules, was applied to the analysis of the sharp band at 3630 cm⁻¹ (the OH-stretching vibration mode attributed to free OH-monomer) for the (*R*)-, (*S*)- or (*RS*)-butan-2-ol in CCl₄. The mean association number $\langle N \rangle$ for each alcohol increased with increasing in concentration until 0.12 mol dm⁻³ and then becomes constant (about four). On the other hand, Zanker's plotting method, assuming an equilibrium between monomers and only one kind of polymer species, was also applied to the analysis of the above spectroscopic results; the association number n evaluated from the Zanker's method fairly agreed with the $\langle N \rangle$ value in the concentration region of 0.12–0.60 mol dm⁻³.

Słowa kluczowe

Butan-2-ol, Chirality, Hydrogen bonding, Self-assembling

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