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Study for hydration structure through the refractive index during microwave irradiation
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Abstract (less than 300 words)
<p>Generally, several solvent molecules are bound around solute molecules and ions in a solution. For example, solute molecules and ions in a solvent form a weak bond with the solvent molecule due to electrostatic interaction with the solvent molecule, and the solvent molecule is oriented around the bond. At this time, the state is called solvation. In particular, when the solvent is a water molecule with a large dipole moment, this hydration becomes a factor that determines the rate of chemical reaction in the solution and precipitation of crystals.</p> <p>On the other hand, it is known that the reaction rate is drastically improved by microwave irradiation in the process of chemical synthesis. We thought that since the reaction rate is related with solvation. In this study, the refractive index was considered as an index for observation of the solvation because the value depends on the speed of light in the medium. For example, water shows relatively a large refractive index because of the strong hydrogen bonds. According to the data for refractive index during microwave irradiation, it was predicted that the solvation temporarily collapses due to rotation of water molecules caused by the irradiation. The behavior strongly depends on microwave power.</p>
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