CAPILLARY ELECTROPHORESIS AS A VERSATILE TOOL TO INVESTIGATE COMPLEXES IN AQUEOUS SOLUTIONS

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Complex is defined as an entity composed of two or more components such as metal-ligand, enzyme-substrate, and host-guest systems. At the intersection of analytical chemistry and biomedicinal chemistry, we are interested in two complex systems. First, metal-ligand complexes having probe functions such as near-infrared (NIR) light absorption, luminescence, and ^{1}H-relaxation [1]. Second, biomolecular complexes such as DNA-protein, enzyme-inhibitor [2], and so on. In the former, characterization in terms of kinetic stability and distribution of isomers and heterometal complexes are of particular importance to be applied in biomedical systems. In the latter, kinetics and thermodynamics of the biomolecular complex should help to understand the life. To investigate and analyze such complex systems in aqueous solutions, we have used capillary electrophoresis (CE) as a tool by virtue of the separation ability in homogeneous solutions. Moreover, during the electrophoretic migration, components of the complex are steadily removed from the vicinity of the complex, that forces the complex to dissociate. From this, we have established CE reactor to determine dissociation rate of complexes [3]. In this talk, we will deal with our recent results on application of CE as a versatile tools to investigate complex systems in aqueous solutions. Examples are as follows:

1. Separation of *cis-trans* isomers of Pt^{II}-diradical complexes absorbing NIR light for a probe in photoacoustic imaging.
2. Separation of heterolanthanide cluster complexes with thiacalix[4]arene-*p*-tetrasulfonate (TCAS) as a candidate of luminescence probe.
3. Kinetic stability of trypsin-aprotinin complex.

References
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