

Single Polyelectrolyte (다가전해질) Colloids: Principles and Conformational Characterization

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Polyelectrolyte is characterized by charged soft matters bearing ionic groups and accompanying counter-ions, such as water-soluble biomacromolecules, polysaccharides, and some of synthetic polymers. This implies complication arising from Debye screening effect and high sensitivity to external fields. Understanding polyelectrolytes requires the physicochemical principles of long-range interactions, correlation function, order-disorder transition, and stochastic motion, connecting theoretical and experimental approaches. Beyond microstructural properties, dynamics of length and time scales in flow fields and/or in confined spaces plays an important role in a challenge of design and processing to develop new functional structured materials. The latter half of my talk emphasizes the conformational dynamics of polyelectrolyte chain in bulk as well as confined spaces by employing the single molecule detection based on biophysical imaging. Finally, recent advances of the micro/nanofluidic chip will be addressed as a special example of technological applications.