

pH-Sensitive Structural Transformation of the Tyrosine-Containing Bolaamphiphile Molecular Assembly

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These days, self-assembly of biomimetic molecules has been attracting scientific interest due to its potential applications in many engineering fields. In this study, structural transformation of a biomimetic molecular assembly is investigated. A novel biomimetic bolaamphiphilic molecule containing tyrosine at both ends was synthesized through conjugation of alkyl chain with tyrosine, an uncharged polar amino acid. The newly synthesized bolaamphiphile molecules self-assemble in aqueous solution, and display a sensitivity to the acidity of a solution. At a pH lower than 5, this bolaamphiphilic molecules assemble to a spherical structure while higher than 6, it transforms to a microtubular structure. Chemical and optical analysis were performed to characterized the synthesized bolaamphiphile molecular structure and the mechanism of the self-assembly. This convertible structure is expected to be applicable as a micro-carrier of chemical or nanoparticles (e.g. drug) that is sensitive to pH change, and template for the inorganic material synthesis.