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Metal ion/temperature-regulated self-assembled nanostructures originated from various tyrosine-rich biomolecules

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It is well kwown that biomaterials perform several critical functions to miantain biological activity in an organism. The functions are definately dependant on inherent nanostructures of biomaterials, and the specific morphologues are regulated or mantained by the various interactions or strength among the biomolecules such as Van der Waals force, hydrophobic interaction, hydrogen bonding, ion interactions and so on. To achieve a variety of purposes, many studies have been reported on the self-assembled biomaterials with any nanostructures. Among them, peptide nanostructures organized from the unique peptide seqences have been taken a spotlight due to the promising applications in the field of biomedicine, energy, catalysis and so on. Here, we introduce the several types of self-assembled nanostructures originated from tyrosine-rich peptides (H-YYAXAYY-OH; YX_7). They are constructed by a novel one-pot reaction through thermal phase transition in the presence of specific metal ions (different precursors of Au, Pd, Pt, Cu ions, etc.). We also found the reaction pH and media (MES, PBS, etc) have decisive effects on the size and shape of YX7 nanostructures. They were analyzed by SEM, TEM, DLS, zeta potentiostat, UV-Vis and FT-IR. Based on the characterization, we explored any formation mechanism of the metal ion/temerature-related YX7 self-assembly. Finally, we hope that the peptide nanostructures, containing metal ions or metal nanoparticles, can be effctively utilized for drug delivery, biocatalyst, electrochemical sensor or diagnosis.

Biography

Seongsoo Kim has completed his MS in Depertment of Chemical Engineering of Kangwon National University, Republic of Korea, and is now studying his Doctorate in the same college. His studies are focused on syntheses and applications of bio-nanomaterials, especially inculding eco-friendly recyclable catalysts, biomaterial-based biosensor platforms and so on.

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