

Exploitation of Biomolecular Recognition: Preparation of Conducting Polymer Microtubes using Peptides with Specific Affinity

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Recent unique properties of biomolecules such as enzymatic property and specific recognition to the target substances have been exploited to develop a variety of materials and devices. In this study, an application of a specific peptide which has a good affinity to a conducting polymer, polypyrrole, was demonstrated in fabricating conducting polymeric microtube. To prepare polypyrrole microtube, self-assembled structure of bolaamphiphile molecules was prepared. Onto this organic template, the peptides were bound through hydrogen bond. Subsequently, the polypyrrole clusters were deposited on it. The polypyrrole was selectively deposited on the tubular template due to the strong affinity to the peptide. Hydrogen bonding of peptide to the self-assembled template was identified from spectroscopic investigation. Prepared pyrrole microtubes showed characteristic photoelectronic properties of polypyrrole. This peptide-based fabrication method of selective polymer deposition can be applied to future devices with biopolymer and bioelectronic interfaces.