Density Control of Self-assembled Metalloprotein Monolayers by Surfactant

이종범, 김대진, 최정우, 구기갑*
서강대학교 화학공학과
(koo@ccs.sogang.ac.kr*)

A new technique for the density control of self-assembled monolayers of metalloproteins including ferredoxin and cytochrome c onto metal substrates were developed using a zwitterionic surfactant. The elution ability of the selected surfactant, CHAPS (3 - [(3 - cholamidopropyl) dimethylammonio] - 1 - propanesulfonate), enabled us to segregate protein aggregates nonspecifically adsorbed on the metal substrates, which has been a long-term problem in the fabrication of biomolecular electronic devices. The high-resolution AFM images of self-assembled protein monolayers from the surface of metal substrates with CHAPS treatment clearly shows that the size of protein clusters is on the order of a few molecules of proteins. Whereas the sizes of protein aggregates on the same substrate without CHAPS treatment were measured to be about 200nm. The electrochemical property of self-assembled protein monolayer on gold surface was confirmed to remain intact by means of the cyclic voltammetry measurements. The present technique would be useful to the preparation of self-assembled monolayer with diverse biomolecules.