

Nanoscale Film Formation of Recombinant Azurin with Various Cysteine Residues on Gold Substrate for Biomemory

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Metalloproteins are nano-sizes and possess inherently charge retention property, which make them to use as a molecular device platform. Azurin has copper as a key element in the electron transfer mechanisms. The robust fabrication of molecular layers with fine orientation are one of the key processes. Protein variants with various cysteine residues were designed by site-directed mutagenesis. The resulting recombinant protein retained its original redox property in the same manner as native azurin. The orientations of azurin variants with cysteine residues immobilized on Au were analyzed by fluorescence microscope, scanning tunneling microscope, and surface plasmon resonance. Our data revealed that binding activity of azurin variant with two cysteine residues on Au significantly increased in comparison to azurin with single residue. Immobilization of highly oriented recombinant azurin based on cysteine-modification could be useful for the nanoscale fabrication of biomemory.