

## Anti-contaminant, Blood-repellent, and Biocompatible Superhydrophobic Surface Using Water-immiscible Mussel Adhesive Protein

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A superhydrophobic surface (SHS) is a hydrophobic surface with sufficient micro/nano-sized roughness. However, due to weak durability of SHS, chemical adhesives were widely used but they could not apply to complex 3D structures and not fabricate uniformly and thinly coated surface under underwater coating processes. In addition, their toxicity is another limitation. In this study, we developed SHS using immiscible adhesive based on underwater nature organisms, mussels and sandcastle worms. Mussel adhesive protein (MAP) has 3,4-dihydroxyphenylalanine and lysine. Their immiscible property, inspired by adhesive of sandcastle worms, was formed by the charge interaction between MAP and hyaluronic acid. Immiscible MAP was feasible to coat thin and uniform layer by dipping the adhesive into the dissolved nanoparticles of SiO<sub>2</sub> and TiO<sub>2</sub> using electrostatic attraction. A robust superhydrophobic SiO<sub>2</sub>(TiO<sub>2</sub>/SiO<sub>2</sub>)<sub>n</sub> thin coating was applied to the catheter with anti-thrombotic property. Furthermore, the SH/MAP patch with anti-biofouling and biocompatible tissue closure characteristics was prepared by spraying the hydrophobic SiO<sub>2</sub> nanoparticles onto the MAP-covered patch.