

Mussel-Inspired, Fast Surface Modification of Solid Substrates

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Recently, mussel-inspired surface modification, called polydopamine coating has been extensively implemented to many areas, due to its material versatility and ease to use. In particular, incubation of substrates in an alkaline dopamine solution resulted in self-polymerization of dopamine and modified variety of material surfaces, including noble metals, metal oxides, ceramics, and synthetic polymers. However, the polydopamine coating has a drawback to practical use; it takes more than 12 hrs to introduce sufficient polydopamine layers to solid substrates.

Here, we investigated the rate-enhanced polydopamine coating by varying reaction conditions: pH, concentration, and the addition of the oxidizing agent. As a result, the optimum condition for fast polydopamine coating was found, and solid substrates were efficiently coated with polydopamine layers in just few minutes using the condition. The polydopamine-modified surface was characterized by XPS and contact angle goniometry, and the biocompatibility of the modified surface was also proved by cell attachment test.

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