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## Facile fabrication of superhydrophilic/superhydrophobic surface on titanium substrate by single-step anodization and fluorination

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### Abstract

A facile and scalable technique for preparation of superhydrophilic/superhydrophobic titanium (Ti) surface by single-step anodization and fluorination is presented in this paper. The Ti substrates were anodized to produce micro-nano hierarchical structure which is essential for superhydrophilic surface. The water contact angles (WCAs) of 5 $\mu$ l water droplets on the anodized Ti surfaces were measured as low as 0°. Capillary rise measurement was used to evaluate the superhydrophilicity on Ti surfaces anodized at different conditions. Results show that higher anodization voltage can yield stronger superhydrophilicity on Ti surface, but the influence of electrolyte temperature on the superhydrophilicity has a close correlation with the anodization voltages. At 20V and 40V anodization voltages, the increase of electrolyte temperature can improve the surface superhydrophilicity, but this trend will be reversed when the voltages rise to 60V and 80V. Superhydrophobic surfaces were further obtained from fluoroalkylsilane (FAS) modification on the anodized Ti substrates. It was observed that appropriate anodization voltages and electrolyte temperatures can balance the growth and dissolution of the micro-nano hierarchical

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