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Autoclaving-induced *in-situ* grown hierarchical structures for construction of superhydrophobic surfaces: A new route to fabricate antifouling coatings

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ABSTRACT

A simple fabrication method was developed to prepare a superhydrophobic aluminum surface. The approach involved the in-situ formation of a micro/nano-structure and fluorination treatment on an aluminum surface. Based on the combination of micro/nanostructures and low-energy compositions, the as-prepared surface became super-repellent toward deionized water and biological liquids including egg white and egg yolk. A water contact angle of 160^o and a contact angle hysteresis of 1.8^o were observed on the fluorinated aluminum surface with hierarchical structures. Meanwhile, the surface presented excellent antifouling performance against marine diatom *Phaeodactylum tricornutum* by the air layer captured within the micro/nanostructures. The results indicated that the structures played a critical role in the formation of a superhydrophobic surface with excellent antifouling capability. The work provides a simple and highly efficient method to fabricate superhydrophobic aluminum surfaces with exceptional antifouling performance.