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Design and Fabrication of Micro-textures for Inducing a Superhydrophobic Behavior on Hydrophilic Materials DI GAO, LIANGLIANG CAO, ANMIN CAO, HSIN-HUA HU, University of Pittsburgh — Artificial superhydrophobic surfaces are typically fabricated by tuning the surface roughness of intrinsically hydrophobic surfaces. We here report the design and fabrication of micro-textures for inducing a superhydrophobic behavior on intrinsically hydrophilic hydrogen-terminated Si surfaces with an intrinsic water contact angle of about 74 degree. The micro-textures consist of overhang structures with well-defined geometries fabricated by microfabrication technologies, which provide positions to support the liquid and prevent the liquid from entering the indents between the micro-textures. As a result, water is in contact with a composite surface of solid and air, which induces the observed macroscopic superhydrophobic behavior. The principle is applied to fabricate non-aging superhydrophobic surfaces by packing flower-like micrometer-sized hematite particles. The as-fabricated superhydrophobic surfaces do not age even in extremely oxidative environments—they retain the superhydrophobicity after being stored in ambient laboratory air for 4 months, heated to 800 degree C in air for 10 hours, and exposed to ultraviolet ozone for 10 hours.

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