

Fabrication of Asphalt-based Superhydrophobic Surface Showing the Transition between Cassie-Baxter and Wenzel Wetting State

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Superhydrophobic surface is a surface with static water contact angle larger than 150° . This surface has two wetting states: “slippery” Cassie-Baxter state with low contact angle hysteresis and “sticky” Wenzel state with high contact angle hysteresis and surface adhesion force. Wetting states of superhydrophobic surface depend on surface morphology and surface energy. We report the fabrication of superhydrophobic surface from asphalt tar, and change the wetting state from Cassie-Baxter to Wenzel state. To fabricate the Cassie-Baxter surface, the tar-coated substrate was heated to 450°C . After the combustion, carbon soot from the reaction created hierarchical nano-structures. To change its wetting state to Wenzel state, ethanol was dispersed on the fabricated surface, and then dried at 70°C . The surface morphology and composition of the fabricated surface were characterized using SEM and XPS. The fabricated Cassie-Baxter state surface showed static contact angle of 167° and contact angle hysteresis of 4° , while Wenzel state showed static contact angle of 155° and contact angle hysteresis of 50° .