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Rational construction of highly transparent superhydrophobic coatings based on a non-particle, fluorine-free and water-rich system for versatile oil-water separation

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Abstract

Despite the existing effort, fabricating superhydrophobic substrate through an environmental friendly approach remains a great challenge. In the current work, we present a simple approach to fabricate robust superhydrophobic surfaces on different kinds of substrates using phase-separation method. This method uses (polydimethylsiloxane) PDMS as the binder, tetrahydrofuran (THF) as the solvent, and water as nonsolvent. The emulsion prepared under optimum proportion of THF and water was stable and showed no obvious change even after being stored for 6 weeks. The coated substrates exhibit superhydrophobic property with a water contact angle (CA) larger than 155.0°. Moreover, because the solution is rich of water, and the surface modification condition is mild, the PDMS coating enjoys a high degree of