

Wet-Style Superhydrophobic Coatings with Antifogging and Self-Cleaning Properties

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Transparent substrates are widely used in various optical applications including lenses, displays, and sensors. However, these substrates are often challenged with excessive fogging and surface contamination. In this work, we present a polymer thin film composed of a hydrophilic reservoir and a hydrophobic capping layer with high water permeability which allows water molecules to preferentially condense into the underlying hydrophilic reservoir, while the hydrophobic capping layer resists wetting by water droplets. In addition, we show that this physical concept of zwitter-wettability can be further extended to a wet-style superhydrophobic coating which simultaneously exhibits antifogging property and superhydrophobicity. Furthermore, we demonstrate that pattern transferring low-surface-energy microstructures onto a hydrophilic reservoir allows contaminants adsorbed on the surface to be easily removed by rinsing with water.