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Structure and property analysis for a fractal superhydrophobic surface model

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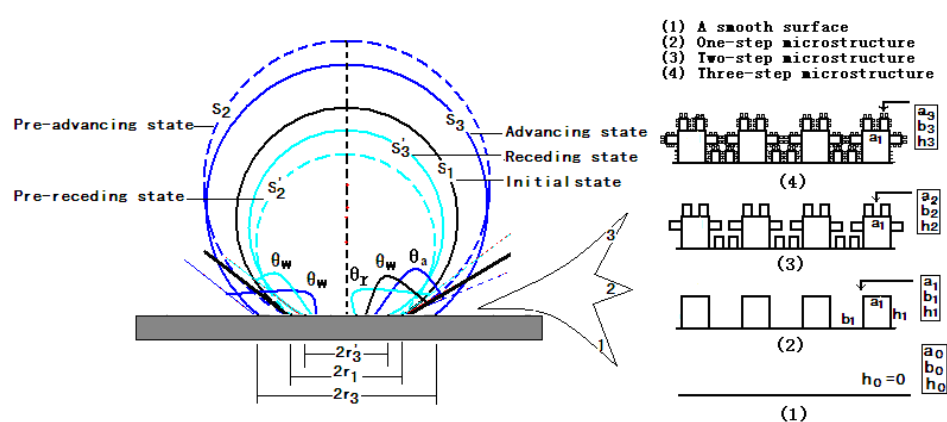
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Graphical abstract



A lateral section of changes of droplet states on superhydrophobic surfaces with different step microstructures

Highlights

- > A general relationship is established between hydrophobic properties and step microstructures.
- > A superhydrophobic surface with three-step microstructure is unnecessary.
- > An adhesive work may be used for characterization of solid-liquid interface.
- > A determination of the critical roughness for transition from adhesive work.

Abstract

Superhydrophobicity depends mainly on the microstructures of a surface. Although the superhydrophobic surfaces (SHS) have been fabricated, micro-mechanisms responsible for its contact angle hysteresis (CAH) and free energy barrier (FEB) still need to be deeply investigated. For this reason, we attempt to compare the superhydrophobicity of the different hierarchy for the SHS based on a three-dimensional (3-D) pillar model by a more practical thermodynamic method. Therefore, general relationships between the superhydrophobic property and the proposed surface microstructures are also established based on the CAH

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