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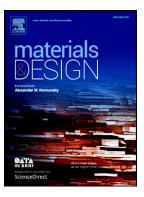
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Self-assembly of stearic acid into nano flowers induces the

tunable surface wettability of polyimide film

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Abstract

Polyimide (PI) films with special wettability have received great attention for their

potential applications. However, it is still a challenge to fabricate PI film with tunable

wettability from hydrophobic to superhydrophobic and tensile strength > 140 MPa.

Herein, PI films with tunable surface wettability induced by the nano flowers of SA

through the self-assembly. Flower-like ZnO was grown on PI film without seed layer

or morphology controlling agents via a simple hydrothermal method, which promoted

to the self-assembly of SA into nano-flowers. Morphologies of ZnO crystals change

from open-flower to sphere-bud just by tuning the synthetic concentration of zinc

solution. SA can assemble into nano flower-like structures on all ZnO modified films

resulting in water contact angles changing from 124.0° to 155.5°. The self-assembly

mechanism was also investigated. The superhydrophobic PI exhibits stable

superhydrophobicity under dynamic water pressure, which is a crucial parameter for

potential self-cleaning employment. Thermal stability of superhydrophobic film are

comparable to the pristine PI film. Tensile strength of superhydrophobic PI film is

higher than 140 MPa.

Key Words: self-assembly; wettability; nano flower; polyimide; hydrothermal

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