

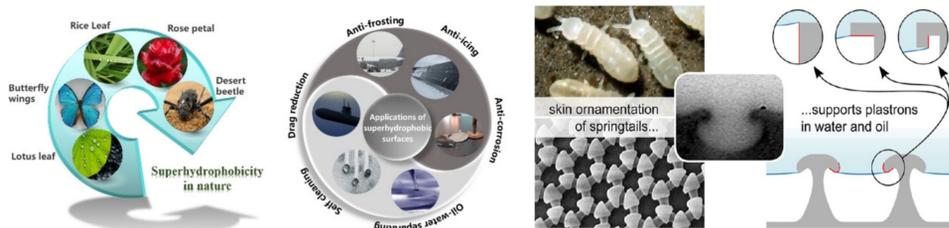


# Facile fabrication of transparent superamphiphobic surface by template-assisted spraying coating

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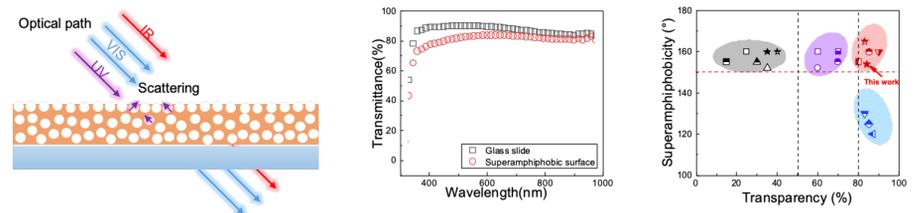
## 1. Introduction

Most surfaces in daily life facing the challenge of contamination by dirt, oil and other liquids with low surface tension<sup>1,2</sup>. It is essential to maintain high optical transparency to enable the application of superamphiphobic surfaces to optical and electronic devices such as solar cell panels, and electronic screens<sup>3</sup>. Careful control of the degree of roughness as well as matching of the refractive index of the coating materials<sup>4,5</sup>.



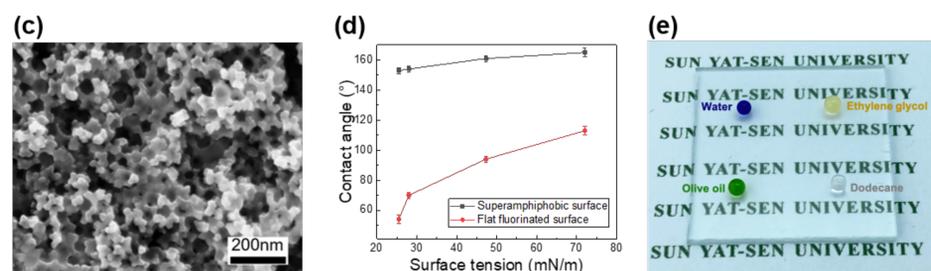
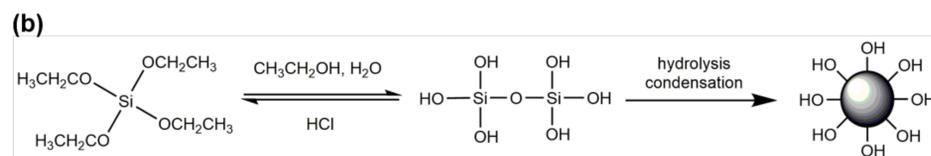
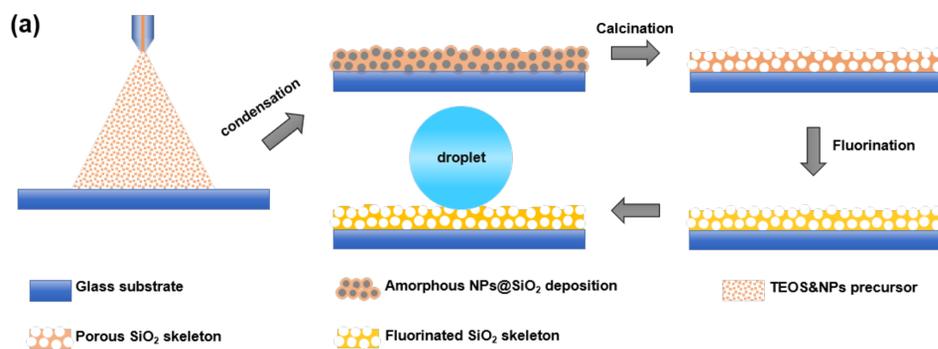
## 4. Transmittance

All thin coatings (coated 15 times) transmit more than 87% as compared to the transmittance through the pristine glass substrate for wavelengths higher than 500 nm. Even thick coatings can transmit 60% of the light.



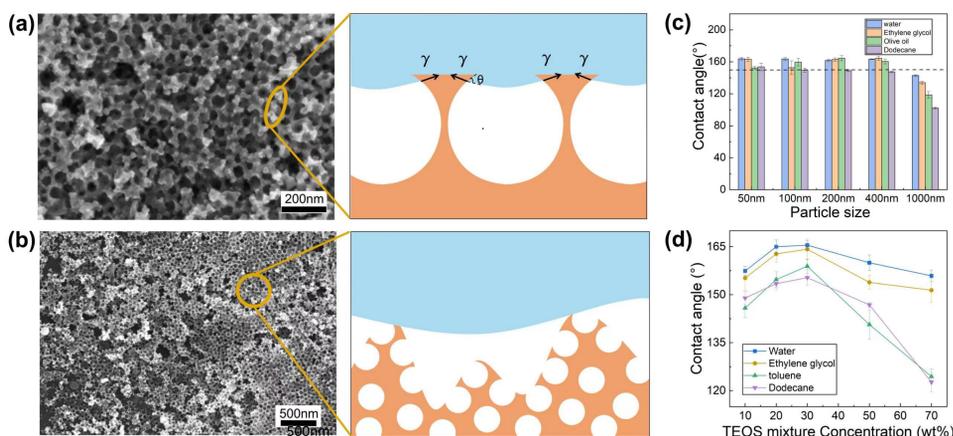
## 2. Methods

We create a transparent superamphiphobic surface by combining the **spray and template method** based on the Stober reaction.  
The loose fractal-like nano-reentrant structure is formed on the surface of coating and greatly improves the **oleophobicity** of the coating while maintaining the **high transparency**.



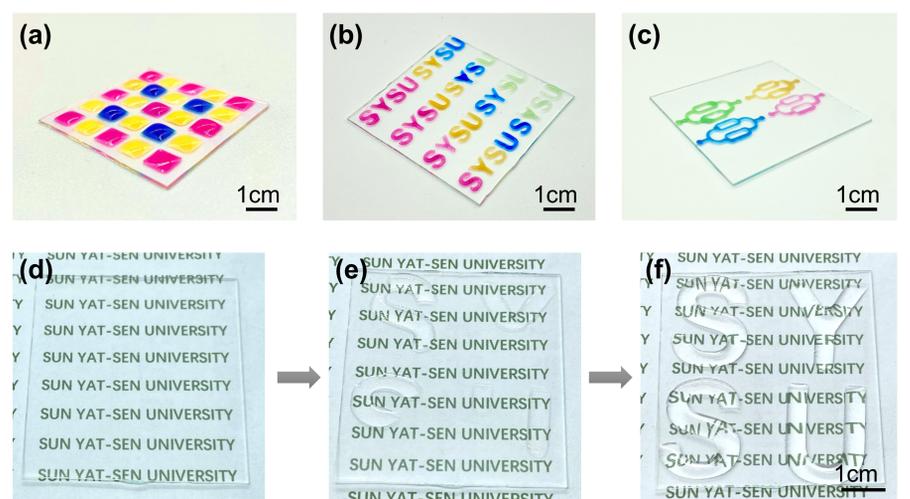
## 3. Wetting Behaviors

Our coating consists of random **reentrant nanostructures** and loose **fractal network**.  
For low surface tension liquids, a reentrant structure is required to suspend the liquid and resist it from wetting into the cavity.  
Besides, the fractal structure needs to be introduced to reduce the overall wetted area of the solid and thus adhesion of drops.



## 5. Application

Patterned surface for anticounterfeiting



Self-cleaning and anti-bacterial



Wide applicability



## 6. Conclusion

- We demonstrated a **facile method to fabricate transparent and superamphiphobic surfaces** by spray coating of PS particle mixed silica sol-gel precursor based on template method.
- The loose fractal, nano-porous SiO<sub>2</sub> network was formed on the surface of coating. The coating **owns not only excellent liquid-repelling for relatively low surface tension liquids but also high transparency**. It is convenient to massively fabricate on a variety of planar and curved substrates.
- Moreover, we show how a facial method can be used to accurately confine the liquids with varying surface tensions to designated areas of surface for **anti-counterfeiting**.

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