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A superhydrophobic transparent polydimethylsiloxane (PDMS) film with TiO₂ nano particles

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Abstract

In this paper we have present a novel fabrication method of PDMS thin film with diverse microstructures for superhydrophobic surface. We designed various square shapes to control the surface roughness. The PDMS thin film with diverse microstructures arrays are fabricated by using single mask process. High aspect ratio photoresist SU-8 is used for the PDMS molding. Moreover, spray method is utilized to coat TiO₂ nano particles on the PDMS molding. Then, the micro-nano structured superhydrophobic film can be achieved after a replica PDMS molding, as shown in Figure1. On the experimental result, contact angle at square shape arrays was approximately 148°. The transmittance in the visible wavelength range is measured using an UV visible NIR spectrophotometer. The transmittance of the PDMS film with microstructures was more than approximately 95%. This transmittance superhydrophobic film can be applied to car windshield, which can realize self-cleaning and ensure the driver has a clear view even in rainy days.

Keywords: Superhydrophobic, PDMS film

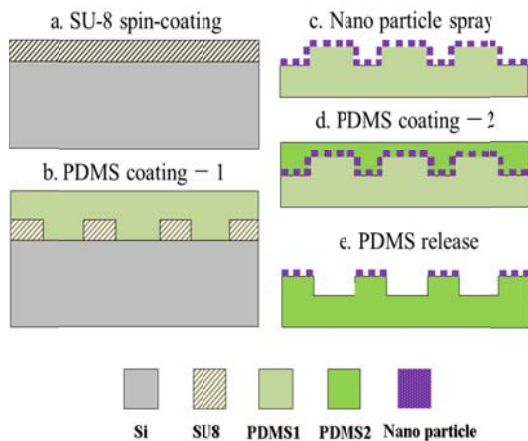


Figure 1. Fabrication process of the PDMS thin film with diverse microstructures.

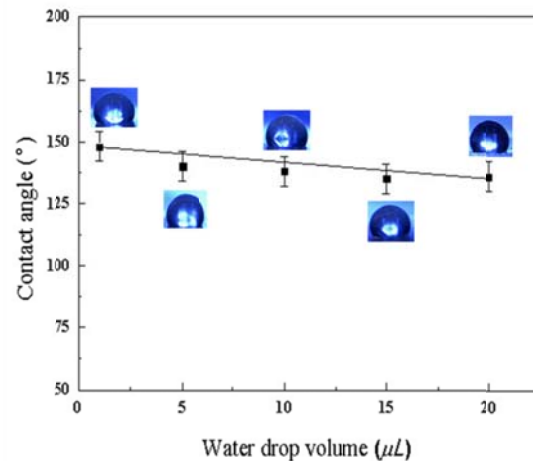


Figure 2. The relationship between water drop volume and contact angles on micro-nanostructured PDMS films.

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