

Preparation of Sprayable Transparent Superamphiphobic Coating Based on Silicone Rubber

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Abstract: A novel method to fabricate a sprayable transparent superamphiphobic coating using silicone rubber was presented. The waste silicone rubber was firstly calcined to form SiO_2 aggregates which were then fluorinated and dispersed in solvent, and the fluorinated SiO_2 suspension was sprayed on the substrate to form the transparent superamphiphobic coating. The morphology of SiO_2 aggregates and coatings were analyzed by scanning electron microscopy. The contact angle and sliding angle of droplets on the coating surface were measured by contact angle measuring instrument. High-speed camera was used to record the impact behavior of droplets on the coating surface. The results showed that the SiO_2 aggregates obtained under the calcining temperature of $800\text{ }^\circ\text{C}$, temperature increase rate of $5\text{ }^\circ\text{C} \cdot \text{min}^{-1}$ and calcining time of $3\sim 4\text{ h}$ were extremely loose and rough, possessing a highly porous interweaving network. The superamphiphobic coating was transparent with a contact angle larger than 150° and a sliding angle below 1° . This coating material was easy to prepare, store, transport and use, and the solvents used were cheap and environmentally friendly. It provided a new way to effectively re-use the waste silicone rubber and had broad application prospects in the industrial field.

Key words: superamphiphobic; coating; waste silicone rubber; SiO_2 aggregate; transparent

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