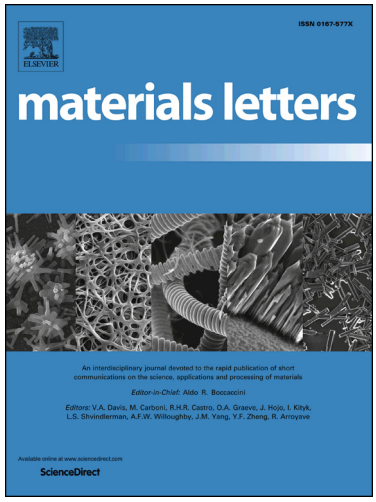

Facile fabrication of fluorine-free, transparent and self-cleaning superhydrophobic coatings based on biopolymer castor oil

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Facile fabrication of fluorine-free, transparent and self-cleaning superhydrophobic coatings based on biopolymer castor oil

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Abstract. A highly transparent self-cleaning superhydrophobic surface was constructed via a facile and environmentally friendly strategy by using biomass-based polyurethane and fused SiO_2 nanoparticles. By simply controlling the amounts of castor oil (CO) and SiO_2, the coating presented excellent superhydrophobic with high water contact angle (158.5°) and low sliding angle (3.9°), as well as the transmittance of the coating was above 80% in visible-light region. Moreover, the coatings showed remarkable robustness against abrasion of 5 cycles without an apparent decrease of superhydrophobicity and possessed excellent self-cleaning properties against dirty contaminant. Therefore, such transparent and self-cleaning superhydrophobic coating could make it an ideal material for application in optoelectronics, liquid-repellent coatings, and oil-water separation.

Keywords. superhydrophobic coating; castor oil; transparent; self-cleaning; polymeric composites; microstructure

1. Introduction

Recently, superhydrophobic materials have gained widely attentions due to their widely used in self-cleaning, anti-bacteria, oil/water separation, microfluidic studies and optoelectronics [1-2]. It is confirmed that proper surface roughness and low surface energy are two key factors to prepare superhydrophobic surfaces [3]. A wide range of materials have been used to establish superhydrophobic surfaces [4-5]. However, superhydrophobicity and transparency are generally two conflicting properties [6].[1]As roughness increased, the superhydrophobicity increased and the

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