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Facile fabrication of durable superhydrophobic silica/epoxy resin coatings with compatible transparency and stability

Minzhen Zhong^a, Ying Zhang^a, Xiangqi Li^{a, b, *}, Xiao Wu^a

^a Institute of Materials Science and Engineering, Fuzhou University, Fuzhou 350108, China

^b Key Laboratory of Eco-materials Advanced Technology, Fuzhou University, Fuzhou 350108, China

Abstract

It is a practical route for taking advantage of the high binding force of epoxy resin to fabricate mechanically robust superhydrophobic surfaces. However, this kind of superhydrophobic surfaces is hard to be endowed with high transparency. Here, we developed transparent and durable superhydrophobic bilayer coatings containing hydrophobic silica particles on top and an epoxy resin bonding layer at the base via a simple approach with common apparatus and reagents. The transmittance of the coated glass at 550 nm is as high as 90.3%, close to the transmittance of 91.8% for the bare glass. The stabilities of these coatings were tested by sandpaper abrasion tests, simulated seawater immersion and heat treatment experiments. The results demonstrate the as-prepared superhydrophobic coatings have excellent self-cleaning ability, good mechanical strength, high chemical and thermal stabilities. Additionally, the method presented here can effectively reach a proper balance between high transparency and excellent durability. The self-cleaning superhydrophobic coatings are independent of the nature of the substrates and have great application potential in industry and

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