Development of Transparent Nano-Structured Super-Hydrophobic Coating on Glass and Evaluation of Anti-Dust Properties

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Abstract : Super-hydrophobicity is an effect in which a surface roughness and chemical composition are combined to produce unusual water and dust repellent surface. The super-hydrophobic surface is widely used in many applications such as windshields of the automobile, aircraft, lens, solar cells, roofing, boat hull, paints, etc. Four coating solutions were prepared by varying compositions of 1,1,1,3,3,3 hexametyldisilazane (HDMS) and tetraethylorthosilicate (TEOS) sol. These solutions were coated on glass slides by a spin coating method and etched at a high temperature ranging 250 -350 oC. All the coatings were studied for its different properties like water repellent, anti-dust, and transparency and contact angle measurements. Stability of coatings was also studied with respect to temperature, external environment, and pH. It was found that all coatings impart a significant super-hydrophobicity on a glass surface with contact angle ranging from 156o to 162o and have good stability in the external environment. The results of the different coatings were observed and compared with each other. On increasing layers of coatings the super-hydrophobicity and anti-dust properties increases but after 3 coatings the transparency of coating starts decreasing.

Keywords : super-hydrophobic, contact angle, coating, anti-dust