

The Study of Wetting Properties of Silica-Poly (Acrylic Acid) Thin Film Coatings

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Abstract : Superhydrophilic, crack-free thin film coatings based on silica nanoparticles were fabricated by dip-coating method. Both thermodynamic and dynamic effects on the wetting properties of the thin films were investigated by modifying the coating formulation via changing the particle-to-binder ratio and weight % of silica in solution. The formulated coatings were characterized by a number of analyses. Water contact angle (WCA) measurements were conducted for all coatings to characterize the surface wetting properties. Scanning electron microscope (SEM) images were taken to examine the morphology of the coating surface. Atomic force microscopy (AFM) analysis was done to study surface topography. The presence of hydrophilic functional groups and nano-scale roughness were found to be responsible for the superhydrophilic behavior of the films. In addition, surface chemistry, compared to surface roughness, was found to be a primary factor affecting the wetting properties of the thin film coatings.

Keywords : poly (acrylic acid), silica nanoparticles, superhydrophilic coatings, surface wetting

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