

ABSTRACT

The non-wetting character derived with the lotus-leaf phenomenon of water droplet rolling off from leaf indicates the Hydrophobic/Super-hydrophobic surface, as described by the Wenzel and Cassie–Baxter theories. Even many natural surfaces display Hydrophobic/Superhydrophobic properties. Such properties are characterized by an apparent water contact angle $>90^\circ/130^\circ$ and various adhesions of water on the surface determined by dynamic contact angle measurements. The basic concepts of the hydrophobic surface their properties and applications have been discussed. Synthesis of composite films with hydrophobic properties using Polymers (PVDF, PMMA, PS) and Silanes (TEOS, MTMS, PDMS) of varied molar ratio have been carried out. Low surface energy leads to the less adhesion and high roughness surfaces, making the film effective for hydrophobic surfaces. Characterizations include FTIR analysis, optical property analysis, surface morphology, roughness and thermal analysis. Contact angle measurement was done to ensure the hydrophobicity/superhydrophobicity of the prepared films. With low surface energy and high surface roughness, hydrophobic property can be obtained. In this study thin films of Polymer-silane composites were prepared by sol-gel and spin coating technique, with the obtained contact angle ranged between 95° to 153° confirming the hydrophobicity. The spectral bands of the composite films have been determined using FTIR spectra. The absence of polar bond proves the hydrophobic nature. These films can also be used as anti-dust coatings as they remove dust easily. And hence has application in window-screens, automobile

windows and solar panels. PDMS- Polymer and TEOS/MTMS/PDMS-Polymer films found application as oil-water separator and they are effective in removing the oil spills.