

Nanostructured surfaces

Encapsulation of micro-scale natural particles by plasma enhanced chemical vapor deposition

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It is known that the surface properties of the particles play a crucial role in determining the overall function and performance of the final product. That's why, encapsulation of particles is very important. Current encapsulating techniques for micro particles with polymers are limited by using liquid-based methods. Such methods rely on applying polymer coating solution onto the particle surface with the subsequent removal of solvent. Moreover, it is very difficult to coat particles uniformly without agglomeration with liquid-based methods, especially for particle sizes below 100 micrometers [1,2].

In this study, rotating-bed plasma enhanced chemical vapor deposition (PECVD) was used to coat natural micro-particles with fluoropolymer thin films. Rotating-bed PECVD system allowed sufficient mixing of particles during the depositions, hence the entire surface of the each particle is exposed to the reactant gases [3]. Chemical and morphological properties of particles were determined by FTIR, XPS, SEM, and contact angle measurements. According to experiment results, the optimum PECVD parameters were determined. Hydrophilic natural particles were successfully transformed into super-hydrophobic.

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