

Staying dry under pouring rain: magic or science?

We all know about waxy products that make car windshield repel water. When it rains, the drops run down the glass without wetting it. In scientific terms, the glass has been made hydrophobic (repels water). The same property can also be achieved by the surface structure instead of a chemical coating, as beautifully illustrated by the lotus leaf [1]. In this case, the corrugation of the surface at the nanometer scale repels water. In fact, it does it so well that these surfaces are called superhydrophobic. The goal of this project is to synthesize a superhydrophobic coating and monitor its effectiveness on various surfaces (textiles, paper, etc). If successful, you will be able to immerse a sheet of paper in water and remove it later, completely dry!! The students will use a relatively simple but powerful technique, called “contact angle measurement” to quantify the degree of hydrophobicity of natural, commercially available, and synthesized superhydrophobic materials. The project utilizes chemical synthesis and characterization to teach students about innovative materials developed through surface nano-engineering.

1. Ind. Eng. Chem. Res. 2013, 52, 12846–12854