Ultrahydrophobic Self-cleaning Materials & Surfaces

Description:

Many materials – fibers, metals, synthetics and textiles – can have improved performance with the ability to repel water and contaminants. This technology provides a process for the modification of material exteriors by the addition of nano-sized or micro-sized particles to create the "lotus effect" – a surface that inhibits water penetration and contaminant adherence. This process includes grafting a hydrophobic material to the surface in order to decrease the surface energy and wettability. The combination of increased surface roughness and decreased surface energy provides an ultrahydrophobic self-cleaning surface on the treated substrate.

Unlike many existing technologies, this invention can be applied to nearly any surface type. For fabrics, the application would be similar to current dye and finish methods without significantly altering the production process. Because the layer of particles is so thin, very little material is needed, keeping costs low. This technique also requires a reduced amount of fluorinated chemistry, which is better for environment.

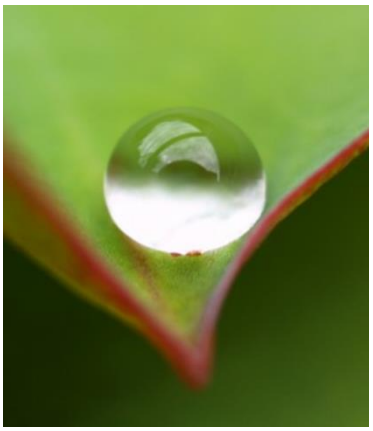

Figure 1: www.wired.com/wiredscience/2009/10/lotus-leaves-the-water-haters

Applications:

- Consumer and military apparel
- Automotive and aerospace applications
- Medical barrier technology
- Applicable to nearly any surface

Benefits:

- Treatment of multiple surface types such as fibrous, synthetic, polymeric or textile materials
- Limited contact area with the material minimizes possible adhesion of solid and liquid contaminants
- Increased benefit to environment compared to other processes

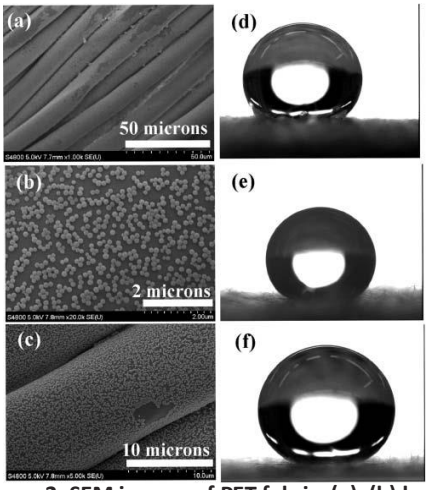

Figure 2: SEM images of PET fabric: (a), (b) low and high magnification after particle attachment and (c) after grafting the SEBS. WCA: (d) fabric ''as is'', (e) fabric grafted with SEBS only, (f) nanoparticle modification and SEBS grafting.
Source: Chem. Commun., 2007, 4510-4512

Inventors: Igor Luzinov, *et al*
Protection Status: Patents issued; # 7,985,451 and # 8,389,114
Licensing Status: Available for licensing
CURF Ref No: 05-017

For more information: contactcurf@clemson.edu 864.656.4237 www.clemson.edu/curf