Ultimate Water Slide

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Hydrophobic Surfaces in Nature

Lotus Leaf

Micro-scale Rendering
Nano-Textures for Fluid Repellency

Lotus-Leaf Surface  Lotus-Leaf Effect

Nano-turf using silicon etching  Carbon nano-tube forest  Chemically treated copper  Micro-molding  Electro-spinning

Our surfaces are:
far more robust, easier to fabricate, not substrate limited, hierarchical, uniform, don’t require functionalization, and can be oleophobic and even super-oleophobic
Bio-mimicry of Hierarchical Surfaces

Lotus Leaf

Lotus ESM Surface

Nano-particle ESM

Hostas Leaf

Hostas ESM Surface

Carbon Nano-Tube ESM
Hierarchal Coatings

Nano-roughness on micron-sized surface features
Super-hydrophobic & Super-oleophobic Nano-Composites

YouTube video: “nanotexture”
Self-Cleaning (Low hysteresis) Coatings

\[ \text{Hyst} = \theta_{\text{adv}} - \theta_{\text{rec}} \]
Wood Surfaces and Hydraulic Lines

For more videos/information visit: nanotexture.tumblr.com/
Application to Hydraulic Lines

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Beauty and Toughness

- Award Winner for MRS “Science as Art” Contest
- Subject of upcoming segment on American Institute of Physics “Discoveries & Breakthroughs Inside Science“
- My 2009 Holiday Card ☺
**Sandable Ph-resistant Performance**

Fig. 2. ESEM image of surface morphology of fluoromethacrylic latex/bio-adhesive organoclay nanocomposites after sanding with 1000 grit Al2O3 paper. The arrows indicate wear marks caused by sanding the surface. The leftover debris on the surface after sanding is also shown marked by the circles.

Fig. 3. Contact angle hysteresis measurements before, (a), and after, (b), sanding the composite surfaces.
Some recent Publications


• I. Bayer, A. Steele, A. Brown, & Loth, E. “Transforming anaerobic adhesives into highly durable and abrasion resistant superhydrophobic organoclay nanocomposite films: A new hybrid spray adhesive for tough superhydrophobicity ," Applied Physics Express December 2009