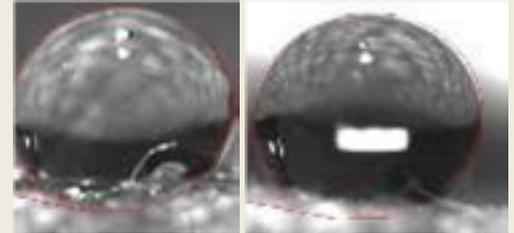




## SUPER-OLEOPHOBIC COATINGS FOR NON-STICK, SELF-CLEANING TEXTILES | WarSTAR

### WHAT IT IS:

- Super-Oleophobic (SO) coated textiles have ultra-low surface tensions so they are non-stick, thus the need for regular laundering is reduced or eliminated; therefore, reducing logistical burden.
- SO coated textiles provide environmental protection from wind, rain, water, & snow, and they are not attracted to dusts, dirt, and aerosol particulates.
- SO coated fabrics are not attracted to solid and liquid toxic industrial chemicals (TICs), petroleum, oil, and lubricants, chemical warfare agents, and bacteria and viruses, thus will enhance chemical/biological protection.)



**LEFT:** SO treated Cotton, Octane (21.6 mN/m), Contact Angle 167°

**RIGHT:** SO treated Cotton, Water (78.8 mN/m), Contact Angle 166°

### WHY IT'S NEEDED:

- Regular textiles and clothing become soiled over time because they absorb water, moisture, household liquid chemicals, as well as industrial toxic vapor, liquid, and aerosolized chemicals, and they also trap dusts, dirt, and unwanted aerosol particulates.
- Soiled disposable clothing must be disposed off, and re-usable clothing are subjected to regular or dry clean washing before they can be reused.



**WASHING & DRYING IS REDUCED OR ELIMINATED**

### HOW IT WORKS:

What keeps the SO coated textiles non-stick to dirt, dusts, and aerosols; not wetted by water, and liquid, vapor, and aerosolized chemicals; and not trapping bacteria and viruses?

- A special fluorinated polymer coating with an engineered nano-sized surface roughness and sub nano-scale architecture having a special "re-entrant surface curvature" will simply not allow liquid to wet the textile materials
- Bacteria, viruses, molds, and mildew cannot establish a foothold on SO treated textiles to propagate and flourish.

Many formulations were developed, measured for their water and organic solvents (e.g., acetone, octane) contact angles, and tested for their physical properties. R&D efforts are underway to ensure SO coated fabrics are durable and have comparable and complimentary properties to its base fabrics.

Development of an integrated protective fabric system incorporating SO textiles is underway through a rational build/test/design/optimize approach to provide non-stick, self-cleaning textiles materials for daily wear and that will enhance CB agent protection.

### POTENTIAL BENEFITS:

- Self-cleaning and non-stick textiles and clothing
- Reduced logistic burden through reduction or elimination of regular laundering



- Reduced cost of repeated laundering of soiled clothing
- Enhanced CB agent protection through minimizing attraction of CB warfare agents
- Super-low drag, and anti-fouling swimming and diving suits

**TECHNICAL CHALLENGES:**

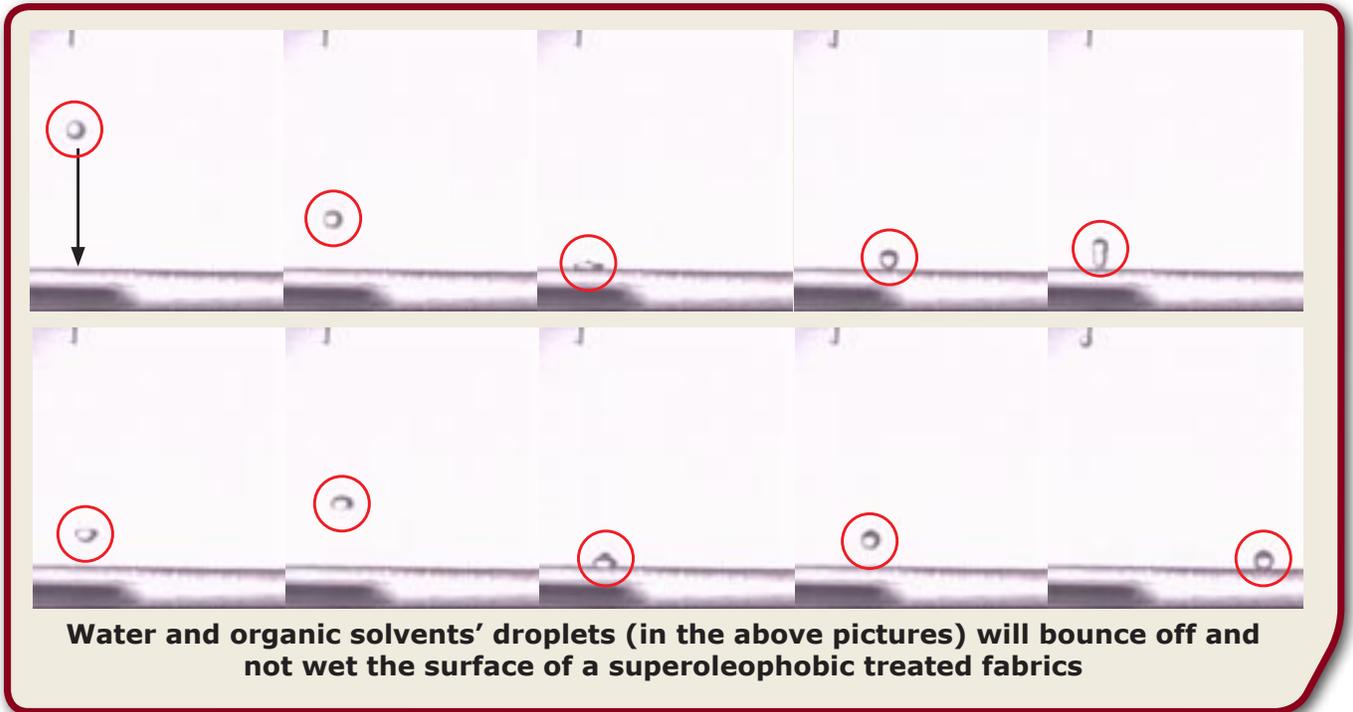
- Durability and stability of SO coating materials on textiles
- Scale up process to coat wide-width textiles

**POINT OF CONTACT:**

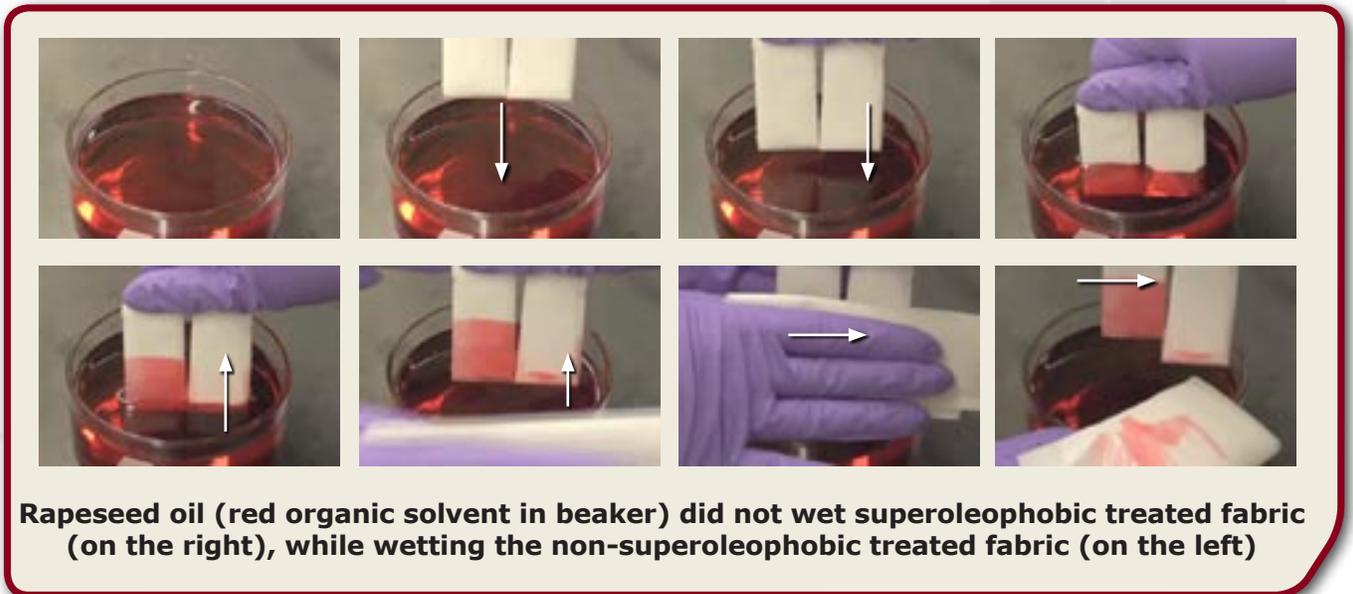
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**Water and organic solvents' droplets (in the above pictures) will bounce off and not wet the surface of a superoleophobic treated fabrics**



**Rapeseed oil (red organic solvent in beaker) did not wet superoleophobic treated fabric (on the right), while wetting the non-superoleophobic treated fabric (on the left)**