

# Hydrophobization

*Protection against humidity and wetting*

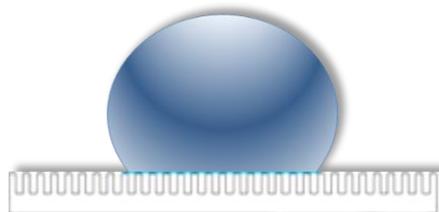
## Hydrophobic surface

A hydrophobic surface is characterized by very weak interactions with water molecules. Water droplets are not attracted by the surface – they take on form of almost perfect spheres that are easily removed by inclining the surface, shaking it or simply by evaporation. Protected material is not wettable and water proof.

Hydrophobic protection prevents water uptake by material which increases users comfort and expands the lifetime of the products. Our hydrophobization technology does not affect other properties of the material which is especially important for example when protecting active membranes.

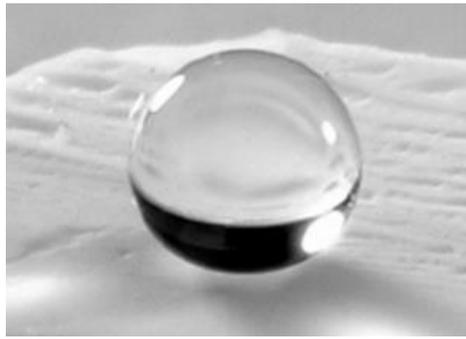
## Water repelling mechanism

Water – surface interactions are determined by two factors. First is the chemical composition – lack of polar functional groups on the surface leads to the absence of attractive forces. Water molecules still attract each other forming spherical drops that easily slide on the surface. The shape of the material in microscale is the second factor. A certain level of roughness allows to form “gas pockets” giving superhydrophobic effect. This phenomenon is observed in nature – self-cleaning louts leaves or butterfly wings.



*Water droplet on a superhydrophobic surface*

At Smart Nanotechnologies we use nanosilica characterized by very high specific surface area and porosity which leads to formation of gas pockets. Originally polar silica nanoparticles surface is modified with nonpolar groups. In effect a high degree of hydrophobicity is obtained.



*Water droplet on modified silica*

## **SNTnanoPHOB**

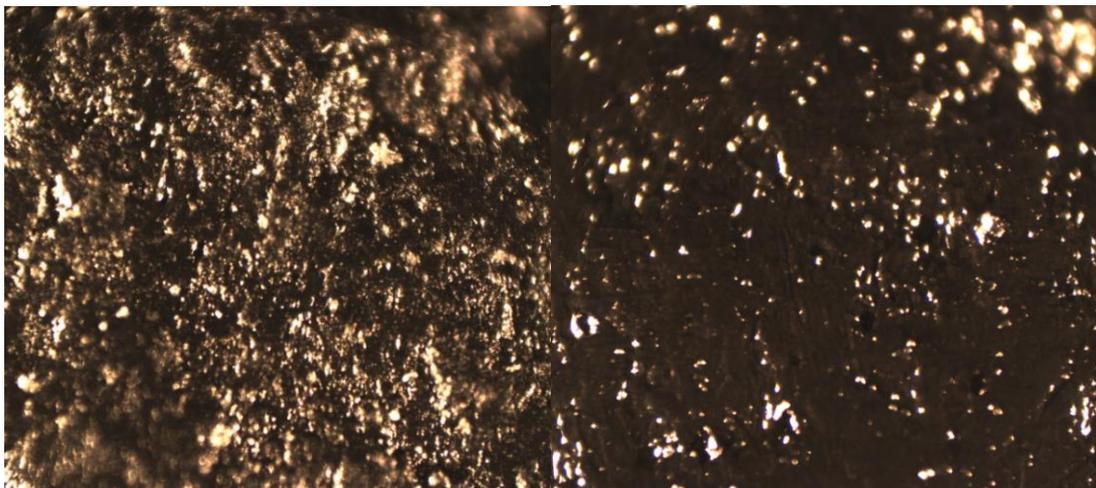
Depending on the material type and application conditions our system is prepared in the form of a solution or a paste. Then it can be applied by spraying, coating or immersing the products. Our technology provides:

- Very high level of hydrophobicity
- Stable and long lasting protection
- Protection against dust, dirt etc.
- Absence of bruises or changes after water evaporation

Moreover, the chemical composition can be adjusted to provide other types of protection of the material.

### **Example – shoe leather protection**

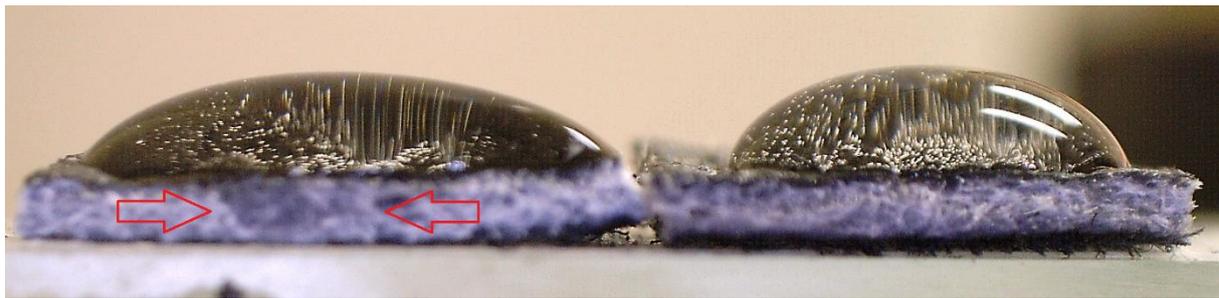
We would like to present the effect of our product for leather treatment. We provide not only hydrophobicity but also conserve the leather due to other components of the formulation.



Before

After

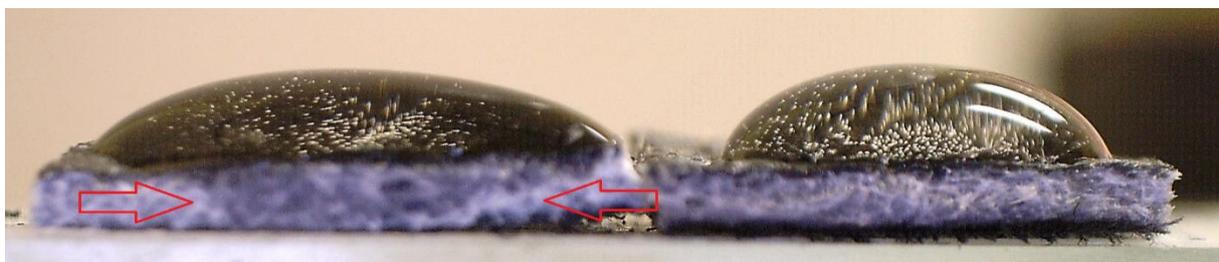
*Leather surface before and after impregnation.  
After the process the surface is more uniform and cracks are less visible.*



Before

After

*Water droplet on leather before and after impregnation.*



Before

After

*Time evolution of the system shown previously. Water uptake by non protected leather.*

Not protected – water soaking

Not impregnated shoe



Single droplets

Impregnated – droplets easily slide off

Impregnated shoe

## Applications

This is only one example. Our technology can be applied in various fields: construction, transport, household chemicals, paper industry, textiles and clothing. We provide efficient and stable protection against wetting, vapor condensation and humidity uptake. So, how about a good book for a bath?



**Let's change the future together**