Engineered surfaces with controlled wettability

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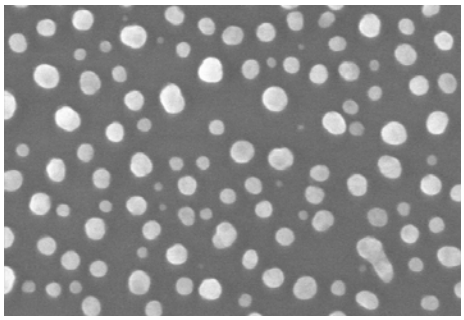
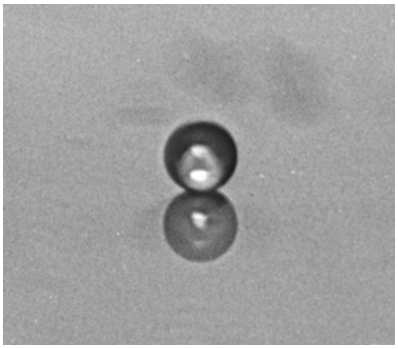
Two families of products will be discussed:

- self-cleaning surfaces
- water-repellent surfaces

Self-cleanliness is a very complex problem, because sources of dirtiness are numerous and very different in nature: organic soiling, organic particles, inorganic particles… In consequence, any practical solution can only be the result of a compromise dictated by the specific conditions of exposure of the considered product. Examples of glass products designed for outside and inside applications will be given. Some of them are based on the quest of high hydrophilicity, other ones on combined photo-induced hydrophilicity and photocatalytic properties.

Water-repellence will be discussed in the context of automotive windshield application, suppression of wipers being the ultimate objective. In this perspective, superhydrophobicity is needed. Products in course of development which are inspired from solution proposed by natural systems - water lily or lotus leaves - will be presented.
In the case of glass surfaces, a further requirement is transparency, meaning that surface texturation must by at the sub-light-wavelength scale. It will be shown that the answer can be found in “large-scale nanotechnology”: nanoscale monitoring of silver de-wetting can be the route to water-repellence at the macroscopic scale:





Nanoscale silver de-dewetting ----------→ Macroscale water-repellence