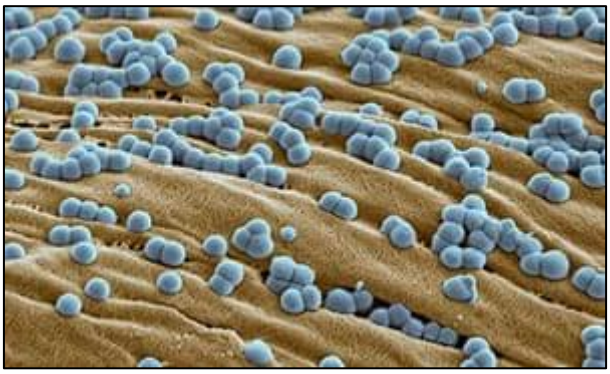
NANOTECHNOLOGY IN TEXTILES – PART III

REF: TT/ DECEMBER 2018 / WK 2

Application of Nanotechnology in Textiles

Self Cleaning Fabric

There are two types of self-cleaning surfaces involving nanotechnology. One is extremely water repellent and microscopically rough surfaces. In which, the dirt particles can barely get a hold on them and are, therefore, can be removed by a simple rinse in water.



The second is given by photo-catalytic layers. Due to a layer of nanocrystalline titanium oxide, fouling organic material is destroyed by solar irradiation.

Using nano techniques, cotton fibres look like tree trunks. These tree trunks are covered in a fuzz of minute whiskers which creates a cushion of air around the fibre. When water hits the fabric, it beads on the points of the whiskers, the beads compress the air in the cavities between the whiskers creating extra buoyancy. The whiskers also create fewer points of contact for dirt. When water is applied to soiled fabric, the dirt adheres to the water more than it adheres to the textile surface and is carried off with the water as it beads up and rolls off the surface of the fabric.

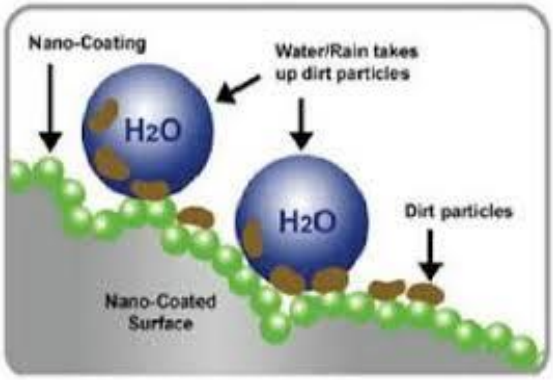


Fig 1.1 Self-cleaning textiles using nanotechnology

Anti Static Finish

As synthetic fibres provide poor anti-static properties, the improvement of these properties is done by using nanotechnology. Nano-sized titanium dioxide, zinc oxide whiskers, nano antimony-doped tin oxide (ATO) and silane nano sol imparts anti-static properties to synthetic fibres. TiO2, ZnO and ATO provide anti-static effects because they are electrically conductive materials. Such material helps to effectively dissipate the static charge which is accumulated on the fabric.

Wrinkle Free Finish

Nanotechnology-based wrinkle-free treatment imparts an improved performance while preserving fabric strength. Chemicals and processing methods reduce a fabrics tear and tensile strength.

Anti Bacterial Finish

For imparting anti-bacterial properties, nano-sized silver, titanium dioxide and zinc oxide are used. Metallic ions and metallic compounds display a certain degree of sterilizing effect. It is considered that part of the oxygen in the air or water is turned into active oxygen by means of catalysis with the metallic ion, thereby dissolving the organic substance to create a sterilizing effect. With the use of nano-sized particles, the number of particles per unit area is increased, and thus anti-bacterial effects can be maximized.

To be continued…

Wishing you a great week ahead!

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