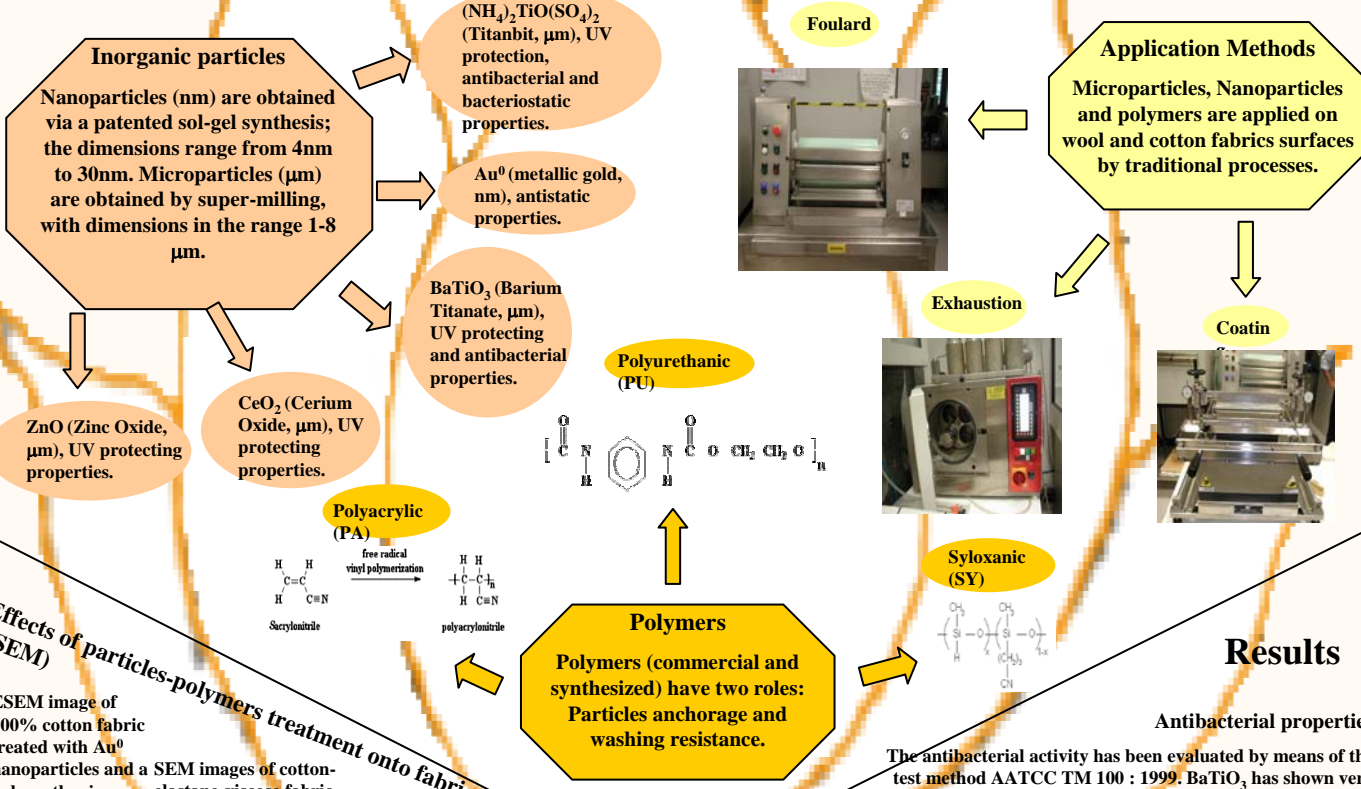




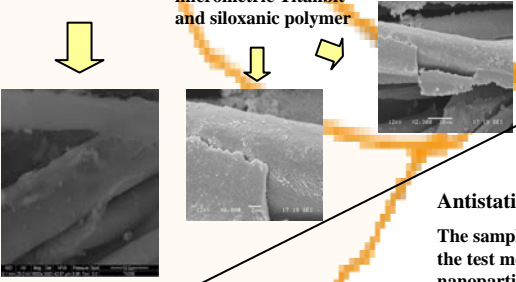
Innovation in apparel textiles through Nano and Micro particles

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Effects of particles-polymers treatment onto fabric surface (SEM)
ESEM image of 100% cotton fabric treated with Au⁰ nanoparticles and a SEM images of cotton-elastane-viscose fabric treated with micrometric Titanbit and siloxanic polymer

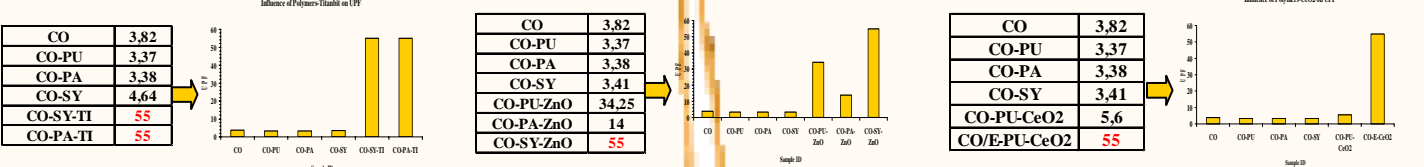


Antistatic properties
The sample performances have been evaluated with the test method UNI EN ISO 1149-1-2 :1999. Gold nanoparticles treatment reduce the vertical and horizontal electrical resistance on any kind of fabric.

Sample ID	% reduction <i>Bacillus Subtilis</i>	% reduction <i>Saphylococcus aureus</i>	% reduction <i>Aspergillus niger</i>
100% Wool	0	0	77,6
100% Wool, BaTiO ₃ (µm), polyurethane. (Foulard)	0	0	30,8
100% Wool, BaTiO ₃ (µm), polyurethane. (Exhaustion)	90,5	35,3	45,3
100% Wool, Titanbit (µm), polyacrylic. (Exhaustion)	85	0	0

Sample ID	Surface Resistivity (ρ=K×R)	Vertical Resistance
100% Wool	122.364×10 ¹¹ Ω	3.26×10 ¹⁰ Ω
100% Wool, 0.4% Au ⁰ (nm)	68.152×10 ⁹ Ω	3.79×10 ⁷ Ω
100% Cotton	61.420×10 ⁸ Ω	4.41×10 ⁷ Ω
100% Cotton, 0.4% Au ⁰ (nm)	18.969×10 ⁷ Ω	1.64×10 ⁶ Ω

UV protecting factor
Upf values have been calculated according to test method EN 13758-12001. Here after we report some of the results regarding a 100% cotton (CO) and a cotton/elastane (CO/E) samples treated by exhaustion with polymers and inorganic particles. We point out that ZnO, CeO₂ and Titanbit give good results on any kind of fabric. It is also important to note how the polymer can influence the inorganic particles performance.



Conclusions

Nanoparticles and microparticles can impart antistatic (Au⁰ nm), antibacterial (BaTiO₃ and Titanbit µm) and UV protection (ZnO, CeO₂ and Titanbit) to fabrics. Polymers are needed to obtain a good anchorage of the inorganic compounds and also to better the washing performances, but their presence has no influence on the former properties. Nanotechnology represent a real new way for the textiles finishing.