

Subject: Physico-chemical characterization of composite materials with photocatalytic properties (textiles and paper) and correlation with photocatalytic tests

Techniques: SEM-EDS, XPS, ToF-SIMS

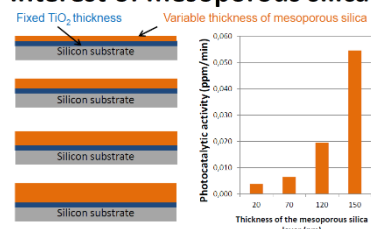
- ✓ Morphology and chemical composition of the surface
- ✓ Correlation of surface analyses with photocatalytic and photo-aging tests

Results:

Micrometric TiO₂/SiO₂ particles

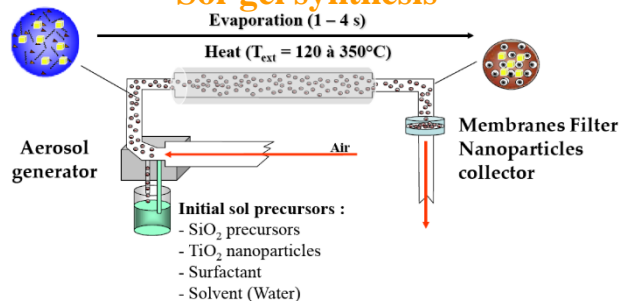
Proof of concept

Interest of mesoporous silica

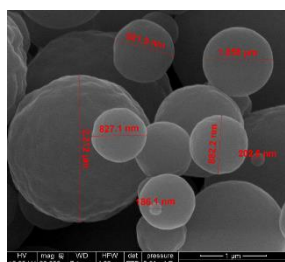


→ Mesoporous silica leads to the protection of the coating where particles are included without precluding the photocatalytic activity

Sol-gel synthesis

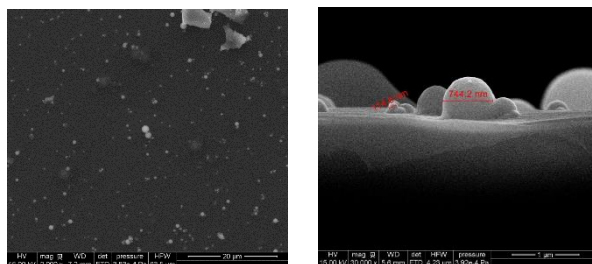


Surface characterization



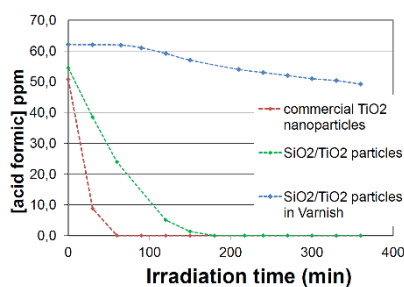
SEM: particles size from 100 nm to 3 μm

Integration into varnish (2.5%wt)



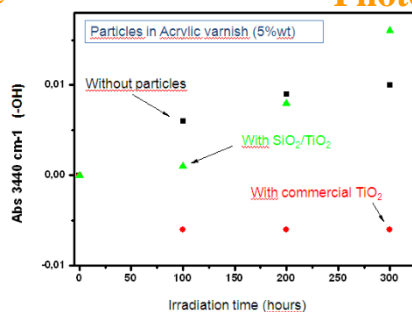
SEM: particles are available at the surface

Photocatalytic test



rate of pollutant degradation after integration into the varnish

Photo-aging



Without SiO₂ -OH → loss of material SiO₂ leads to protection of varnish

Conclusion:

Photocatalytic activity was demonstrated and the protection of the substrates from photoactivity of TiO₂ is highlighted by surface characterizations and photo-aging tests.