NanoGLASS

Burba, Marino

Fortina, Michael

We synthesized silica (SiO_2) nanoparticles: we applied them onto glass surfaces in order to verify if nanoparticles give them some extraordinary properties. For the synthesis we followed the Stober method which involves the hydrolysis of an alkylsilane (tetraethyl orthosilicate) and subsequent condensation to form SiO_2 nanoparticles in presence of ethanol and ammonia as catalyst. We added also a surfactant which avoided nanoparticles agglomerating. Synthesized nanoparticles have been separated, purified and functionalized in order to improve the glass adhesion. At the end they had an average size of 125 nm. Then we applied a 1% w/v nanoparticles dispersion in absolute ethanol and water (95 : 5) on some glass surfaces and let dry to the air. We carried out some tests on nanoparticles treated glass and we repeated the same tests on non-treated glass. The results show that treated glass is more transparent, has a higher hydrophobicity (that means a self-cleaning power) and it is a better thermal insulator compared to the untreated one. Anyway they have the same refractive index and the same electrical conductivity. For these reasons we suggest practical applications in the building (e.g. windows) and in the agricultural industry (e.g. greenhouses) in order to guarantee high quality and low maintenance cost for buildings and eventually contribute to energy and money saving.

Awards Won: