

Lifetime Span Comparison of Self-Cleaning Glass Annealed by Laser and Furnace Heat Treatments

Thursday, May 21, 2015 1:00 PM (3h 30m)

A self-cleaning glass was prepared by a sparking process. Specimens were coated with titanium oxide thin films, and were annealed by heating at 500 °C using a laser and a furnace heat treatments. A lifetime span of the samples was tested by a rainfall simulator. Effect of the laser heat treatment for 10 mins was compared with that of a furnace heat treatment for 60 mins. It was found that water contact angles of the samples prepared by both conditions were approximately the same after accelerated test for 20 years. Furthermore, surface morphology of the samples before and after the tests was examined by atomic force microscopy and scanning electron microscopy. The results showed that the surface roughness of titanium oxide thin films after annealing with the laser and furnace heat treatments can be reduced from 18.39 nm to 8.99 nm and 9.81 nm, respectively. However, the glass transformation was not found in the samples annealed by the laser heat treatments.

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Session Classification: Poster-3

Track Classification: Material Physics, Nanoscale Physics and Nanotechnology