

Fabrication of antireflective and water-repellent hybrid sol-gel coatings

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In this research our goal was to develop bifunctional coating, which increase the transmittance of the substrate and has water-repellent effect. These two special features complete each other in outdoor applications, because the water-repellence effect prevents the adhesion of water drops and other contaminants on the coatings. To achieve this goal we used silica-based hybrid materials, which have nonpolar nature and lower refractive index than that of the glass substrate. The silica-based hybrid coatings were prepared on the glass substrates from alcoholic precursor sols by dip-coating method. In order to decrease the refractive index of coatings, cationic surfactants (cetyltrimethylammonium bromide, CTAB) as templates were used for the preparation. The film thickness, refractive index and porosity of the coatings were investigated by optical spectroscopy methods. The surface of the hybrid coatings was characterized by measurements of water contact angles. For simulating the environmental effects we carried out stability tests by keeping the samples in acidic (or basic) solutions in different time and temperature. After the soaking experiments the stability of the samples was characterized by measuring the optical and wetting properties of coatings.

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