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Abstract

We theoretically simulate the antireflective effects of oxide nanosphere monolayer films in the visible spectrum.
The essential geometric and material parameters of nanosphere films are simulated and different functions are
proposed to describe the dependence of reflectance on the influencing factors. The rational function is fitted to
describe the monotonic decreasing of reflectance on the ratio of nanospheres' radius to incident wavelength. At a
wavelength of 550 nm and incidence at 75°, the reflectance of the glass substrate coated with SiO2 decreases to
14.1% compared with 41.7% of the uncoated glass. The results have an excellent potential for applications in
optical devices such as filters, polarizing elements, and camera lenses.

Figures used in the abstract

Figure 1: Fig. 1. (a) Model of the nanosphere coating film. (b) Uniform depressiononthesurfaceofthenanospherefilm.(c)Randomdepression on the surface of the nanosphere film