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Design and Preparation of Antireflection and Reflection Optical Coatings

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Abstract: In this study, reflective and antireflective coatings were designed and simulated. Optical transmission and reflection values were deduced with a matrix formulation via a personal computer. It was found that the number of layers affects the optical performance. The width of the high-reflectance region in the reflectance curves decreases, while its height increases with the increasing number of layers for the reflective coating design. The antireflection coatings transmit about 99.89% in a broad high-pass band at the central wavelength of λ_0 = 450 nm. In addition, simulated Fabry-Perot filters result in a single sharp transmittance peak at the desired central wavelength. The half-width of the transmission band at central wavelength decreases and its peak height increases with the increasing number of the coated layers. To compare with theory, both sides of a glass substrate were deposited a two-layer coating of MgO/MgF_2 via electron beam evaporation, to produce an antireflective coatings in the visible and near infrared regions. The optical properties of prepared films were studied through optical transmission measurements. The peak transmittance was 98.2% at the central wavelength λ_0 = 450 nm.

Key Words: Optical coating, Antireflective coating, Reflective coating, Optical properties

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