# Study of structure and antireflective properties of LaF3/HfO2/SiO2 and LaF3/HfO2/MgF2 trilayers for UV applications



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| Résumé en anglais | Abstract The aim of this paper is to study antireflective properties of the tree-layer systems LaF3/HfO2/SiO2 and LaF3/HfO2/MgF2 deposited on heated optical glass substrates. The films were evaporated by the use two deposition techniques. In first method oxide films were prepared by means of e-gun evaporation in vacuum of 5 × 10−5 mbar in the presence of oxygen. The second was used for the deposition of fluoride films. They were obtained by means of thermal source evaporation. Simulation of reflectance was performed for 1M2H1L (Quarter Wavelength Optical Thickness) film stack on an optical quartz glass with the refractive index n = 1.46. The layer thickness was optimized to achieve the lowest light scattering from glass surface covered with dioxide and fluoride films. The values of the interface roughness were determined through atomic force microscopy measurements. The essence of performed calculation was to find minimum reflectance of light in wide ultraviolet region. The spectral dispersion of the refractive index needed for calculations was determined from ellipsometric measurements using the spectroscopic ellipsometer M2000. Additionally, the total reflectance measurements in integrating sphere coupled with Perkin Elmer 900 spectrophotometer were performed. These investigations allowed to determine the influence of such film features like surface and interface roughness on light scattering. |
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