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GUEST EDITORIAL

Special Section Guest Editorial: Frontiers of Optical Coatings II

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Optical coatings play a crucial and often decisive role in most modern optical applications. Recent progress in the field of materials, design theory, instruments, and techniques of optical coatings opens up a new avenue for developing advanced thin film optical filters, low-loss coatings, high power laser coatings and novel functional optical coatings that are capable of solving numerous complex problems in areas such as consumer electronics, biomedical, laser systems, security, remote sensing, astronomy, and aerospace.

The *Frontiers of Optical Coatings (FOC)* conference is the top-level conference about optical coatings held in Asia and also one of the largest and highest level academic conferences around the world in this field. The last five FOC conferences have attracted scientists from around the world to present the latest scientific and industry developments of the optical coating domain.

Considering the rapid progress of optical coating and the high-impact of the FOC conference, *Optical Engineering* published a special section of selected papers from FOC2023. The special section consists of seven papers related to recent advances in optical coating range from EUV to infrared.

Thermal radiation from high-temperature application conditions of infrared windows can cause serious interference with infrared imaging systems. Yang et al. investigated the modulation effects of the optical properties and curvature characteristics of the two surfaces on the thermal radiation distribution from the window and proposed an approach to suppress the thermal radiation.

Zhang et al. designed multilayer structures with global optimization for radiative cooling, and the theoretically smallest thickness with the best absorption performance was achieved in the 8 to 13 μm range.

He et al. proposed a high-reflectivity (HR) multilayer film consisting of two mixed-oxide materials with Nb fractions of 20% and 95%. The residual stress of this mixed-oxide multilayer HR film is completely self-compensated through annealing while the reflectance remains high in the wavelength band of interest and spatially uniform over the substrate surface.

Wang et al. investigated multilayer structures with a thin chromium (Cr) layer embedded in the high reflective silver layer and dielectric layers. Reflectivity in the range of 450 to 900 nm can be easily manipulated by adjusting the thickness of the Cr and dielectric layers.

Li et al. evaluated the effect of storage conditions on the performance of $Al/LiF/MgF_2$ mirrors in the far ultraviolet (FUV). It shows that mirrors stored in a 20% RH environment exhibit the smallest degradation of reflectivity and a relatively stable surface morphology.

Zhang et al. proposed to use Al (1.5wt. % Si) to improve the reflectivity of Mo/Al multilayers in the spectral range of extreme ultraviolet. They show that the Mo/Al (1.5wt. % Si) multilayers possess a significantly improved interfacial structure and low surface roughness compared with Mo/Al (pure). And a peak reflectivity of 29.4% at 58.4 nm is achieved for Mo/Al (1.5%Si) multilayers, whereas it is only 17.4% for Mo/Al (pure).

Advantages of high-refractive index (HRI) glass wafers for augmented reality wearables include high transparency, low birefringence, and high mechanical stability. Wang et al. conducted optical characterization of uncoated HRI glass wafers. A refractive index homogeneity of 99.976% and an optical thickness homogeneity of 99.979% were realized. Finally, an anti-reflective coating was deposited, which leads to a visible reflectance below 0.5% over a broad visible spectral range with a desired neutral aesthetic appearance.

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