

Multilayer optical component for different color effects relying on resonant waveguide grating and luminescent coating

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A subwavelength structure composed of a resonant waveguide grating covered by a luminescent coating layer for a dual color effect as shown in the figure below. The resonant waveguide grating is composed of a diffraction grating and a high refractive index guiding layer made from a TiO₂-based sol-gel, with a refractive index ($n_g = 2.2$) higher than that of its silica sol-gel surroundings ($n_s = 1.5$). This structure is designed to produce visible resonant reflection of the TE polarized incident wave in the green color range. The resonant structure is then covered with a layer of silicone doped with phosphors, which emit visible light under UV illumination. The photoluminescence occurs in the orange spectrum. This quasi-symmetric structure is transparent in the visible range, allowing for the observation of various phenomena. Nano-imprint technology is employed to fabricate the grating on the sol-gel layer, demonstrating its manufacturing potential.

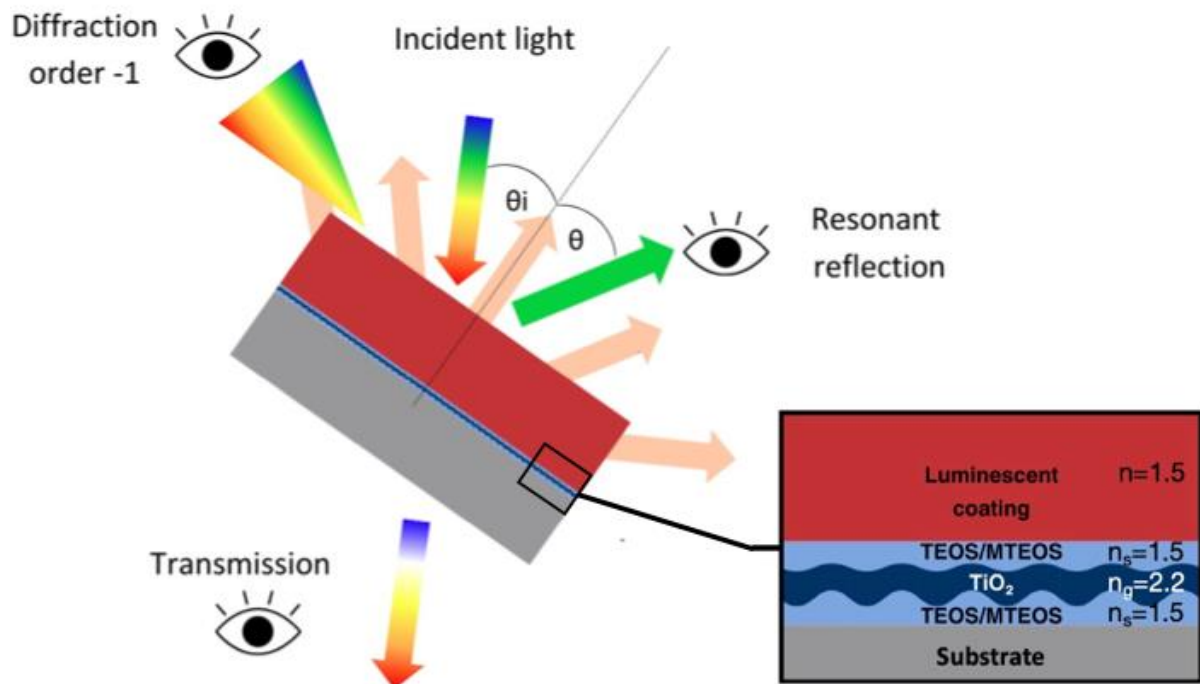


Figure 1: Design of the structure