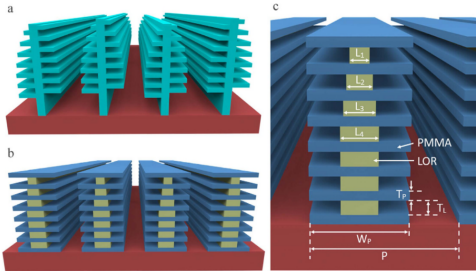


# Literature Review

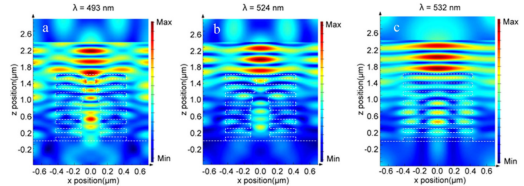
Leon Oleschko

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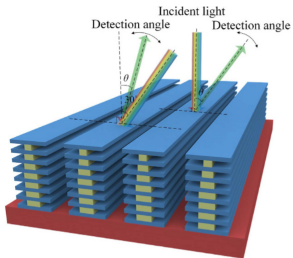
# Nanofabrication and coloration study of artificial Morpho butterfly wings with aligned lamellae layers



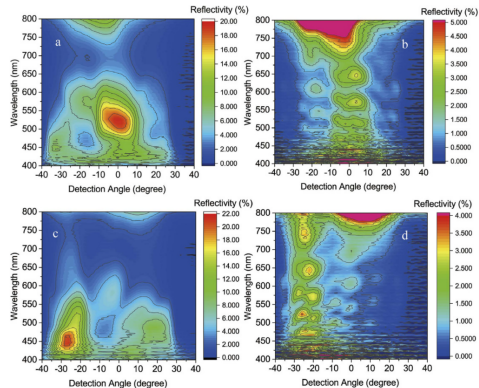
**Figure 1.** Schematic diagram for the *Morpho* butterfly wing scales. (a) The Original configuration similar to real wing scales with Christmas-tree shape and off-set lamellae layers. (b) The designed scales to be fabricated with aligned lamellae structures of PMMA/LOR alternate layers. (c) Definitions of dimension symbols used in the text.



**Figure 3.** The FDTD simulations of spatial distributions of the electric field,  $E^2$  for the three wavelengths in Figure 3b. (a,b) correspond to the wavelengths at 493 and 524 nm, respectively, in Green\_3. The strongest travelling mode seen in the PMMA/LOR pillar in (a) is responsible for the reflection dip at 493 nm in the spectra (both the red and the blue line) in figure 3b. The relatively weak  $E^2$  in the multilayer in (b) (524 nm) and (c) (532 nm) explains the high reflection in the spectra. The dash lines highlight the lamellae structures.



**Figure 7.** The schematic diagram for the light illumination with normal incidence and oblique incidence, respectively. The detection angle changes from 0° to  $\pm 40^\circ$ .



**Figure 8.** The measured angle-resolved reflectance spectra from the fabricated green color scales with totally 15 layers (Green\_3) under normal incidence (a) and oblique incidence (c), respectively. The detection angle changes from 0° to  $\pm 40^\circ$  progressively. For comparison, the same measurements were repeated on PMMA grating (b,d). Detailed descriptions are given in the text.