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Tailored refractive index of inorganic mesoporous mixed-oxide Bragg stacks with bio-inspired hygrochromic optical properties

Mohamed N. Ghazzal, Olivier Deparis, Joel De Coninck, Eric M. Gaigneaux

Supporting Information

In view of maximizing the reflectance/transmittance contrast upon switching, increasing the number of bilayers and then optimizing the effective refractive index contrast upon water infiltration could help to increase the contrast between dry and wet states. Theoretical prediction based on Bruggeman's effective medium theory confirms that, increasing the number of periods enables to raise the Bragg reflection intensity and thus to obtain a more saturated color. The transmittance of Bragg stacks in transparent state (blue curve) is typical of an effective transparent slab though with reduced Fabry-Perot fringes due to the better index matching between the slab and the substrate.

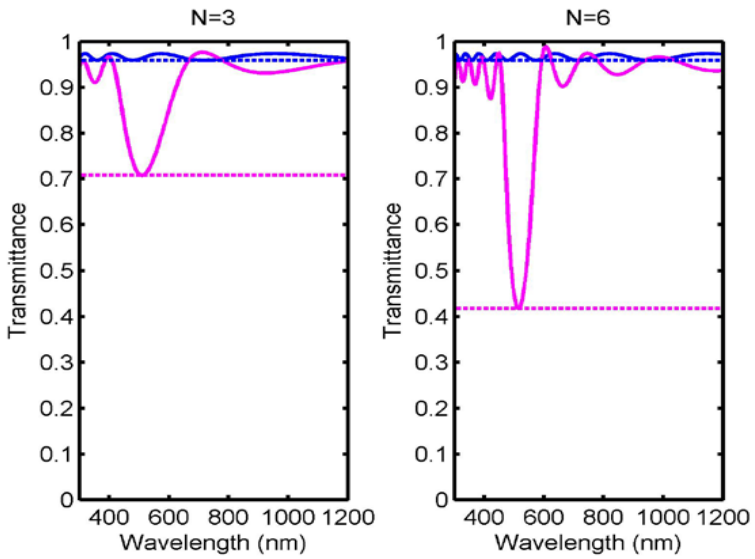

Figure 1: Theoretical prediction of tansmittance spectra of mesoprous Bragg stacks made of N=3 (left) and N=6 (right) bilayers. Transparent state (Blue curve) was obtained by empty pore and the colored state (pink curve) was obtained by filling the pore by water.