Tuneable-refractive-index inorganic/organic hybrid systems for solution-fabrication of distributed all-dielectric Bragg reflectors

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We present a versatile inorganic/organic hybrid material that allows straight-forward control of the refractive index by both varying the composition of the system as well as suitable post-treatment procedures (e.g. annealing and/or UV-light exposure). Refractive indices of more than 2 can be obtained, without sacrificing the transparency of the final architectures essentially over the entire visible spectrum. The hybrid can be processed from solution, thus permitting simple production of layers of dielectric with desired thickness. When used in combination with a low refractive polymer, substantial freedom is therefore obtained to engineer DBRs with essentially 100 % reflectivity in a wide range of wavelengths already at a small amount of dielectric layers.