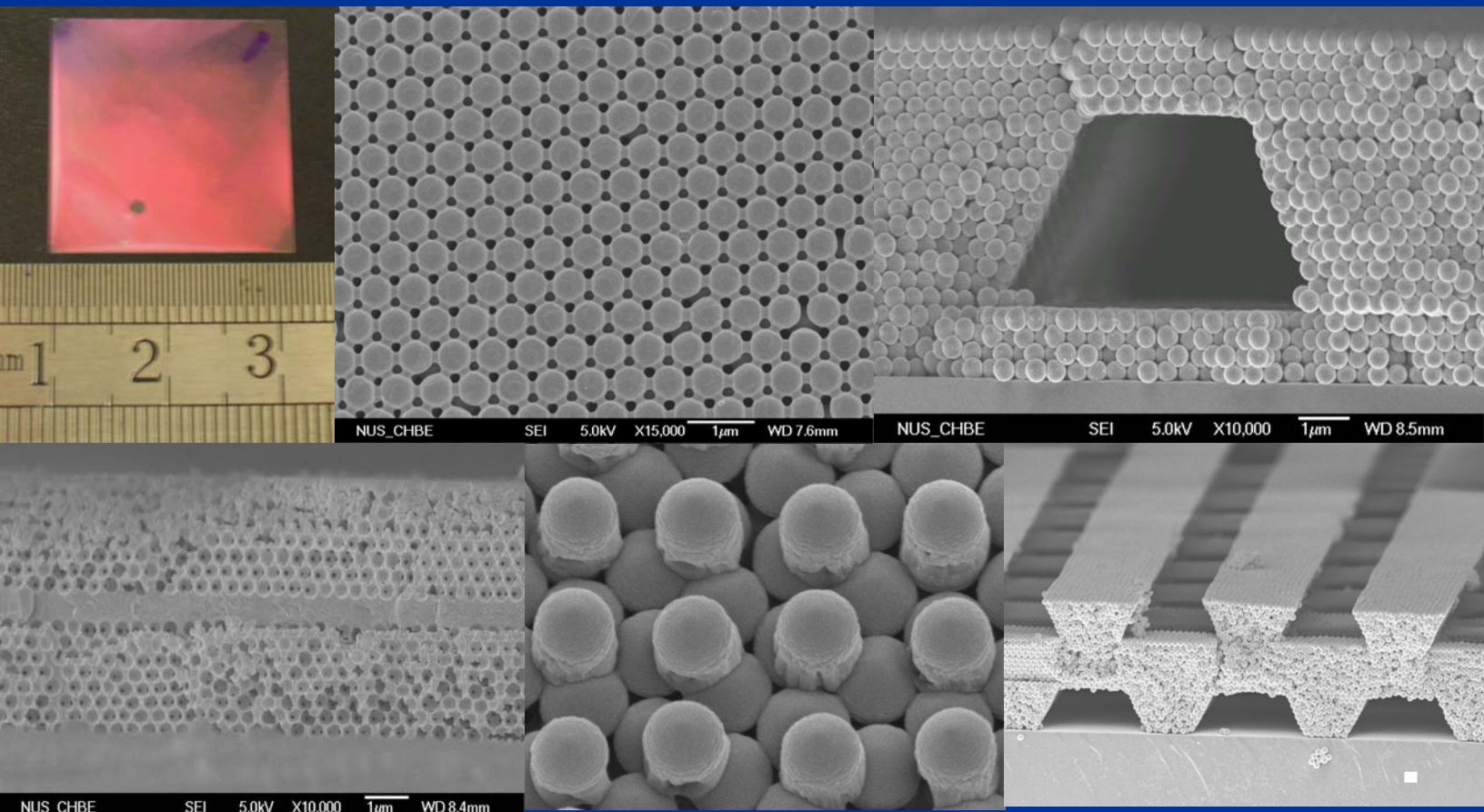


Manipulating Light with 3D Photonic Crystals

Photonic crystals (PCs) are dielectric materials with periodic refractive indexes in 1D, 2D or 3D. Analogous to the control over electrons by semiconductors, 3D PCs are able to manipulate the flow of light because of the presence of a photonic bandgap (PBG), which is a frequency interval over which the linear electromagnetic propagation effects are turned off, facilitating the coherent localization of photons. Because of this property, PCs are the key materials for fabricating optical devices such as optical switches, waveguides, and high-power laser cavities for tomorrow's photonic technology.

“Bottom-Up” self assembly is combined with “Top-Down” lithography to fabricate photonic crystals and devices of various functionalities. 3D photonic crystals in large domains, non-close-packed 3D photonic crystals, line/planar/point defects embedded in 3D photonic crystals, and woodpile structures have been fabricated.



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