SUPPORTING INFORMATION

Structural, Optical and Catalytic Support Properties of γ-Al_2O_3 Inverse Opals

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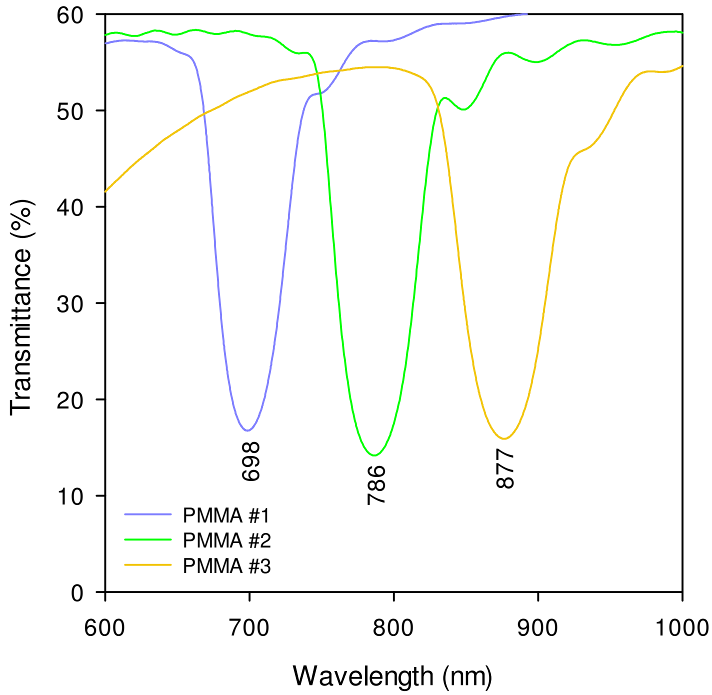


Figure S1. UV-Vis transmittance spectra for PMMA #1, PMMA #2 and PMMA #3 thin films. The spectra were collected along the [111] direction in the colloidal crystals (i.e. at normal incidence to the (111) plane). The photonic band gap (λ_{max}) for diffraction on fcc(111) planes red-shifted linearly as the diameter of the PMMA colloids in the templates increased (see Table 1).

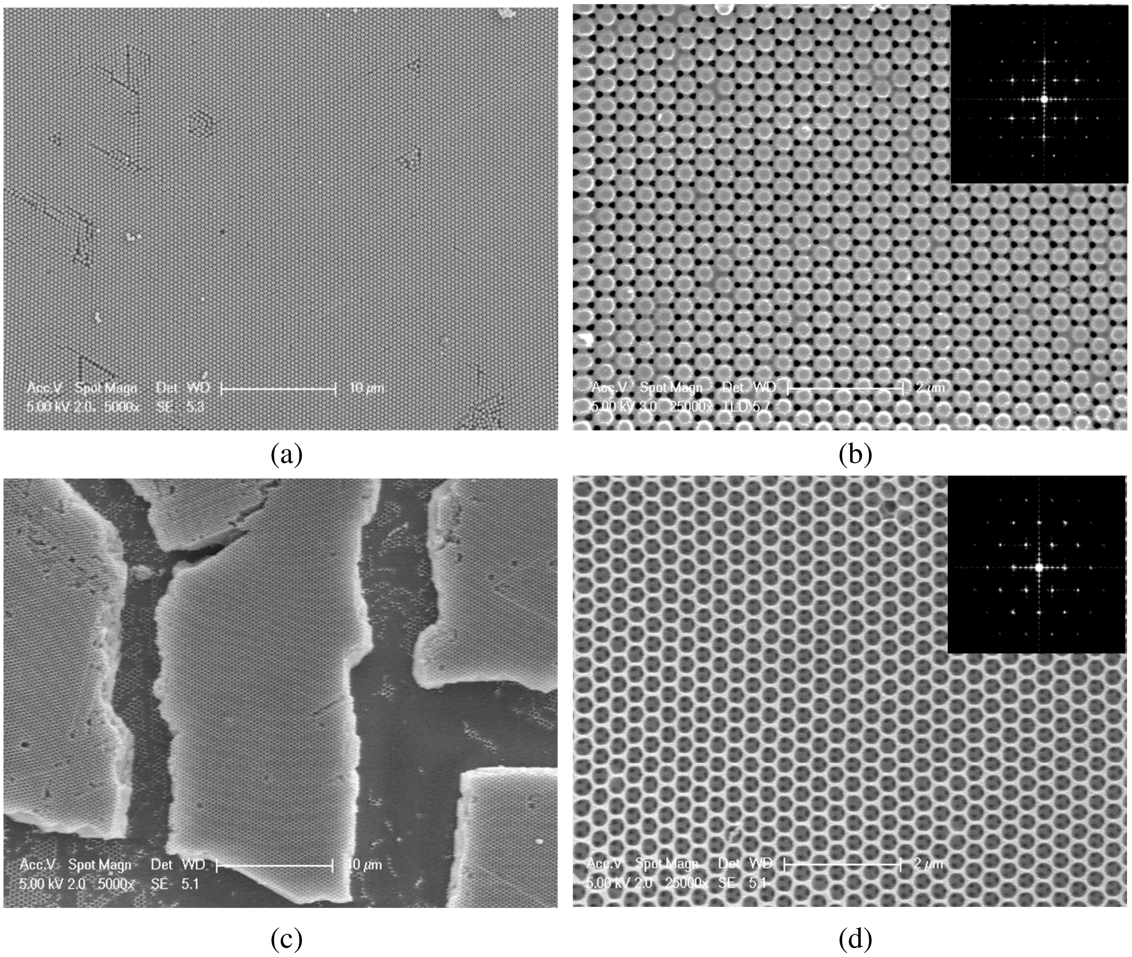


Figure S2. SEM micrographs for (a,b) PMMA #3 and (c,d) γ-Al_2O_3 #3 thin films. Images on the left were taken at 5000× magnification, those on the right at 25000× magnification. Note the preservation of the face-centred cubic structure on fabrication of the alumina inverse opal in spite of the film cracking and shrinking by ~15% in all three spatial dimensions (an overall loss of film volume of approximately 39 %).

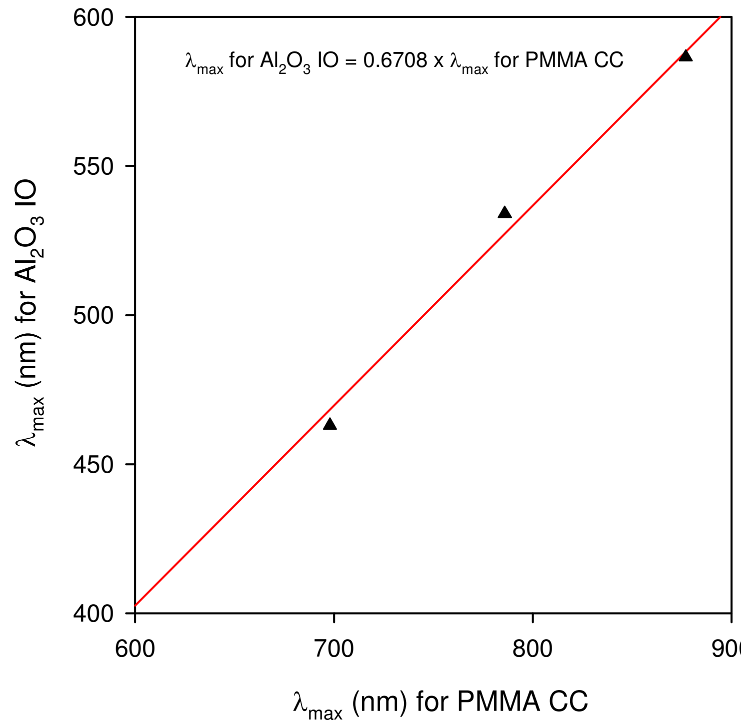
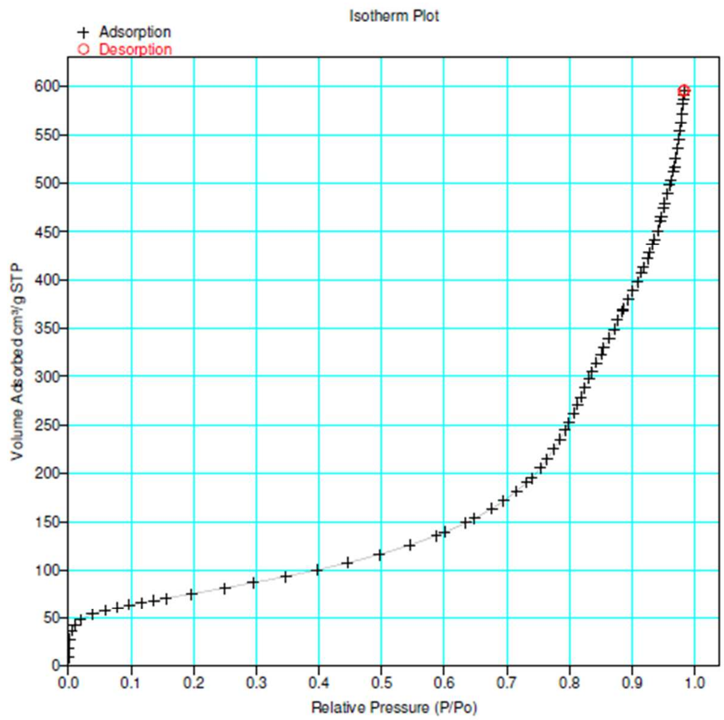


Figure S3. Relationship between the photonic band gap position for diffraction on fcc(111) planes of γ-Al_2O_3 inverse opals and that of the PMMA colloidal crystal template from which they were fabricated. All data was collected at $\theta = 0^o$ with respect to the surface normal of the fcc(111) planes (i.e. along the [111] direction).



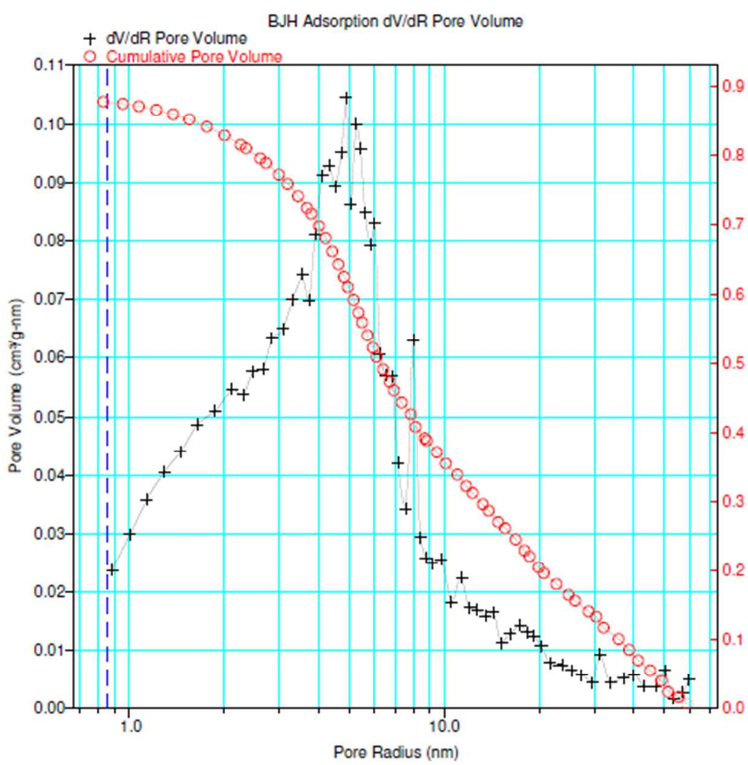


Figure S4. (top) N_2 physisorption isotherm collected at 77 K for Al_2O_3 inverse opal powder following calcination in air at 550 ^{o}C for 4 h to remove the PMMA colloidal crystal template. (bottom) Corresponding BJH adsorption dV/dR pore volume and cumulative pore volume plots calculated from the adsorption branch in the physisorption isotherm assuming a cyclindrical pore shape.

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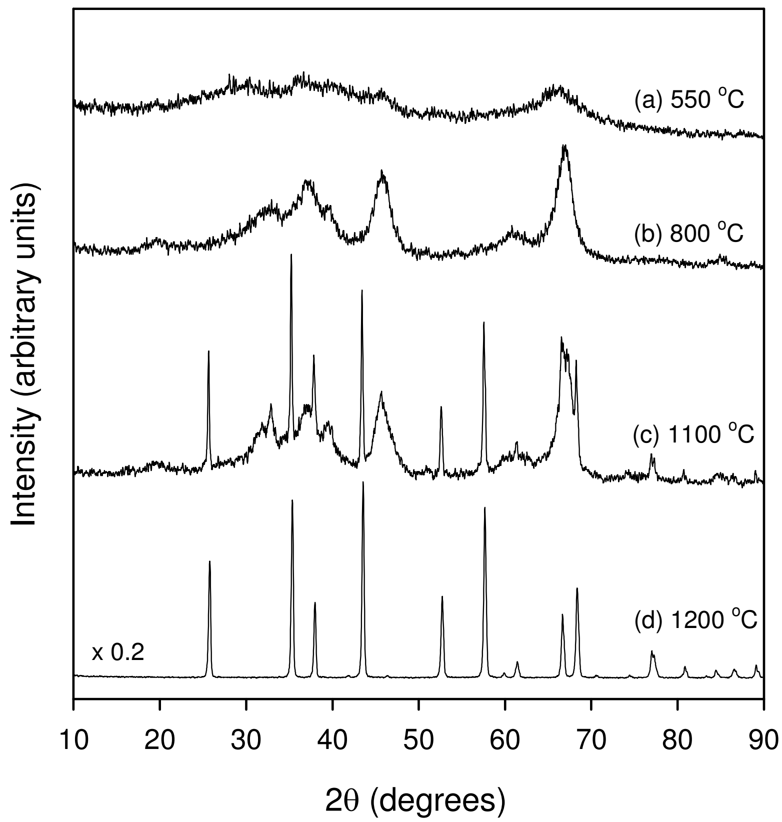

Figure S5. XRD patterns for a sol-gel alumina nanopowder as a function of calcination temperature. The calcination time at each temperature was 4 h.