

Supporting Information: Facile and Rapid Fabrication of Opal Photonic Crystals by Electrophoretic Deposition

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Stöber method. The hydrolysis of tetraethyl orthosilicate and the condensation of silanol groups steps are the keystone to obtain silica. They both involved nucleophilic substitution reaction and their rate can be accelerated by acidic or basic catalysis. Silica nanoparticles are obtained in basic conditions to control the condensation step rather than the hydrolysis one. In acidic condition, silanol monomers will prefer to do the nucleophilic substitution on less substituted Si (linear polymer), leading to film or gel. Whereas in basic condition, the siloxane bond will be favored on the most substituted Si atoms (branched polymers), forming nanoparticles (Figure S1).

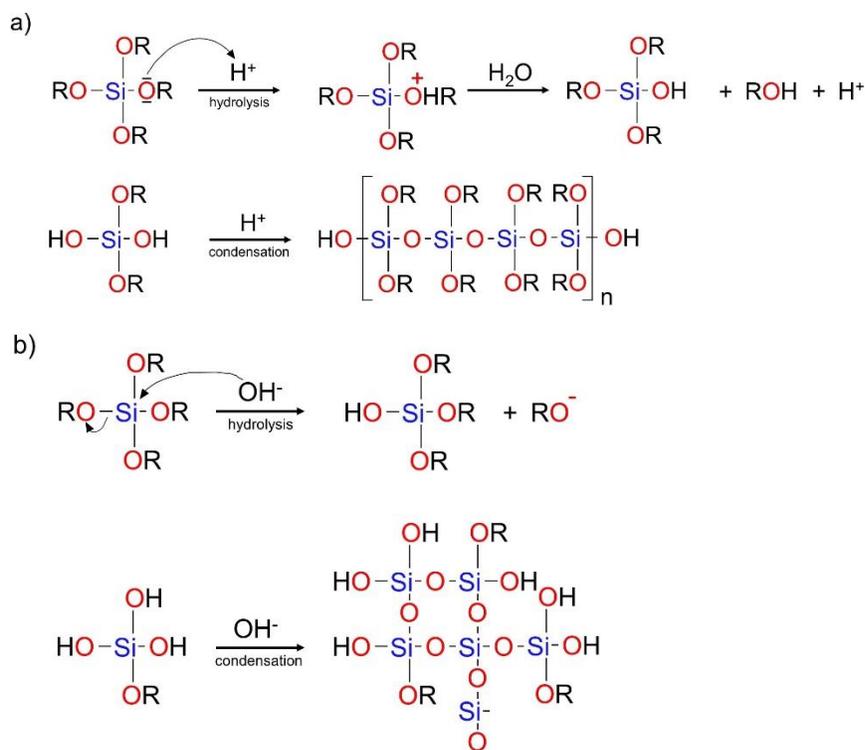


Figure S1. Descriptive scheme of acid (a) and base (b) catalysis for the SiO₂ sol-gel reaction.



Figure S2. Optical photograph of the sedimentation process after 120 hours.

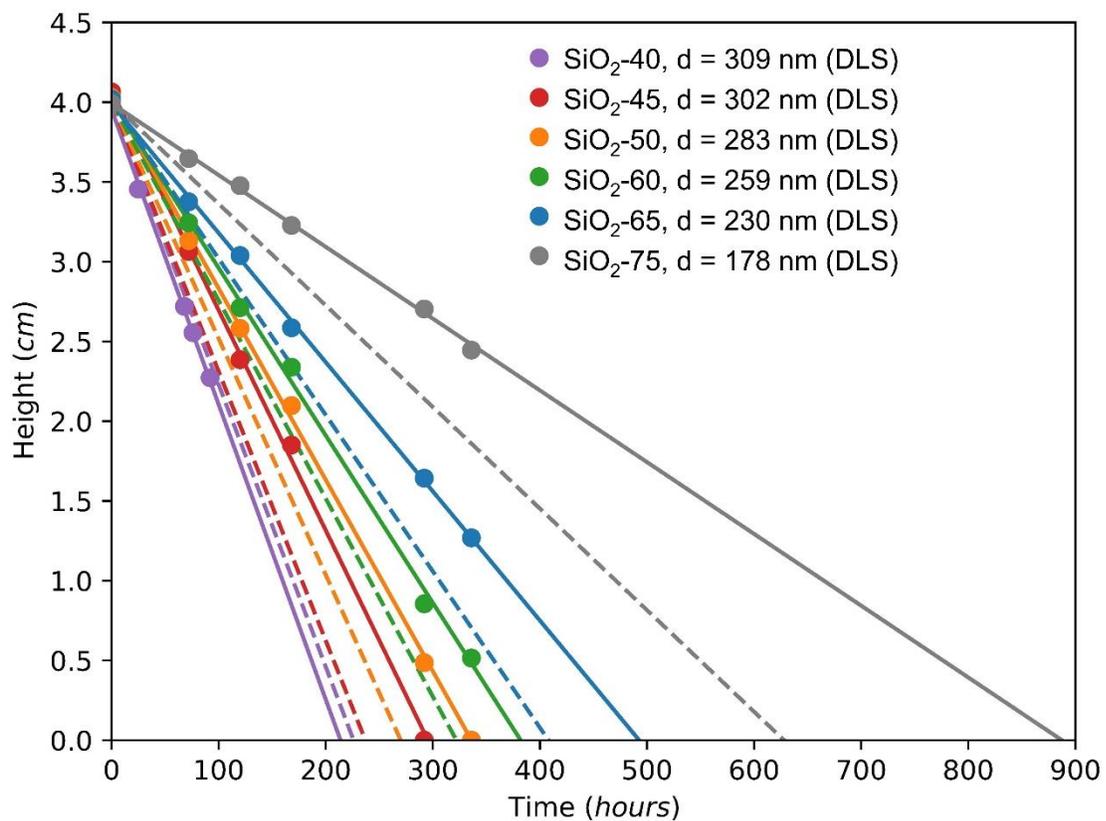


Figure S3. Sedimentation rate of the whole series as a function of time. Solid lines represent the sedimentation rates based on the measured height of sedimentation (dots) and dashed lines represents the theoretical rates based on DLS particle size.

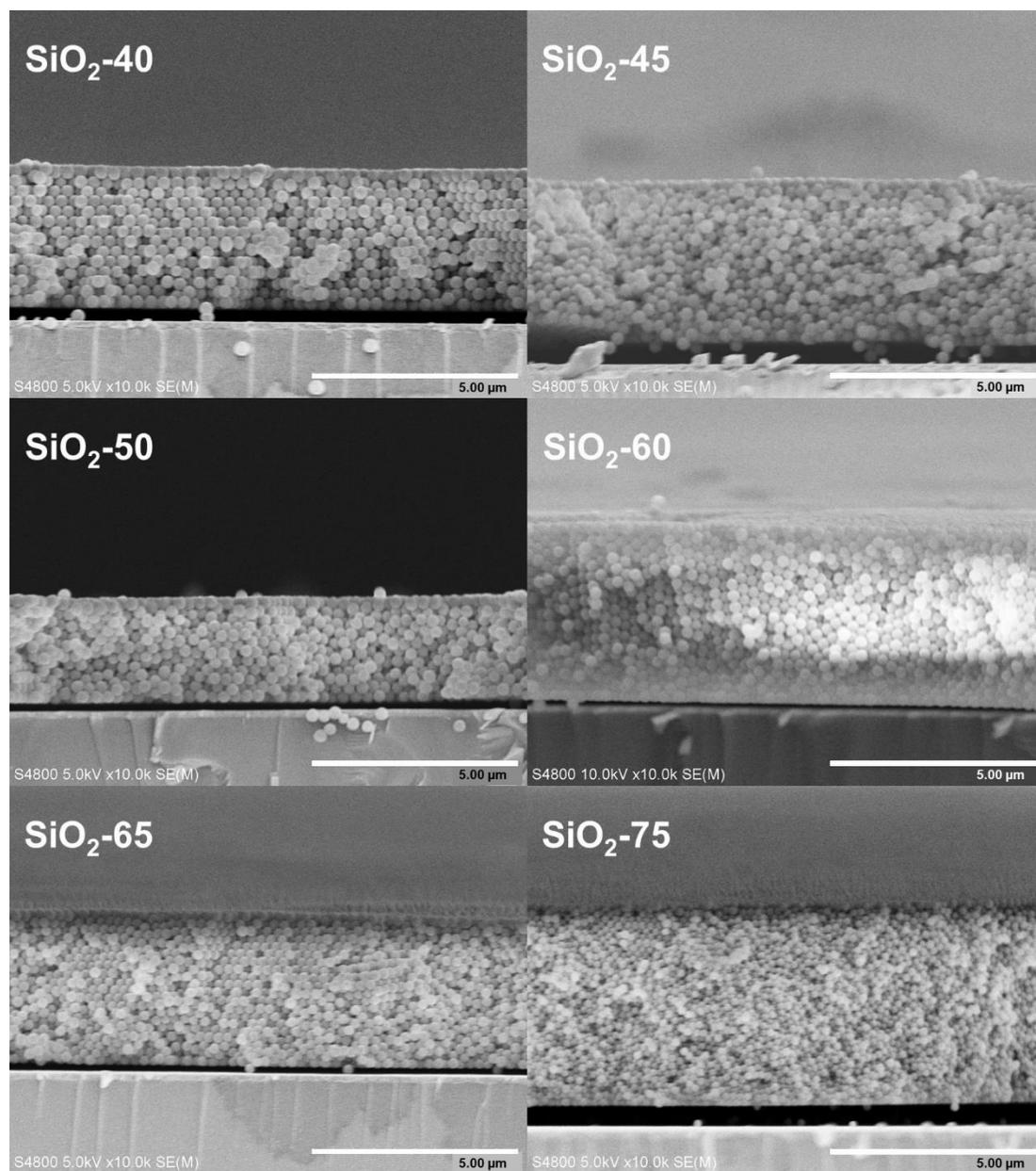


Figure S4. SEM images (cross-section) of EPD PCs fabricated from an ethanol suspension containing 1 wt% of SiO₂ particles (25 V – 2 min). Scale bars have been redrawn for greater readability.

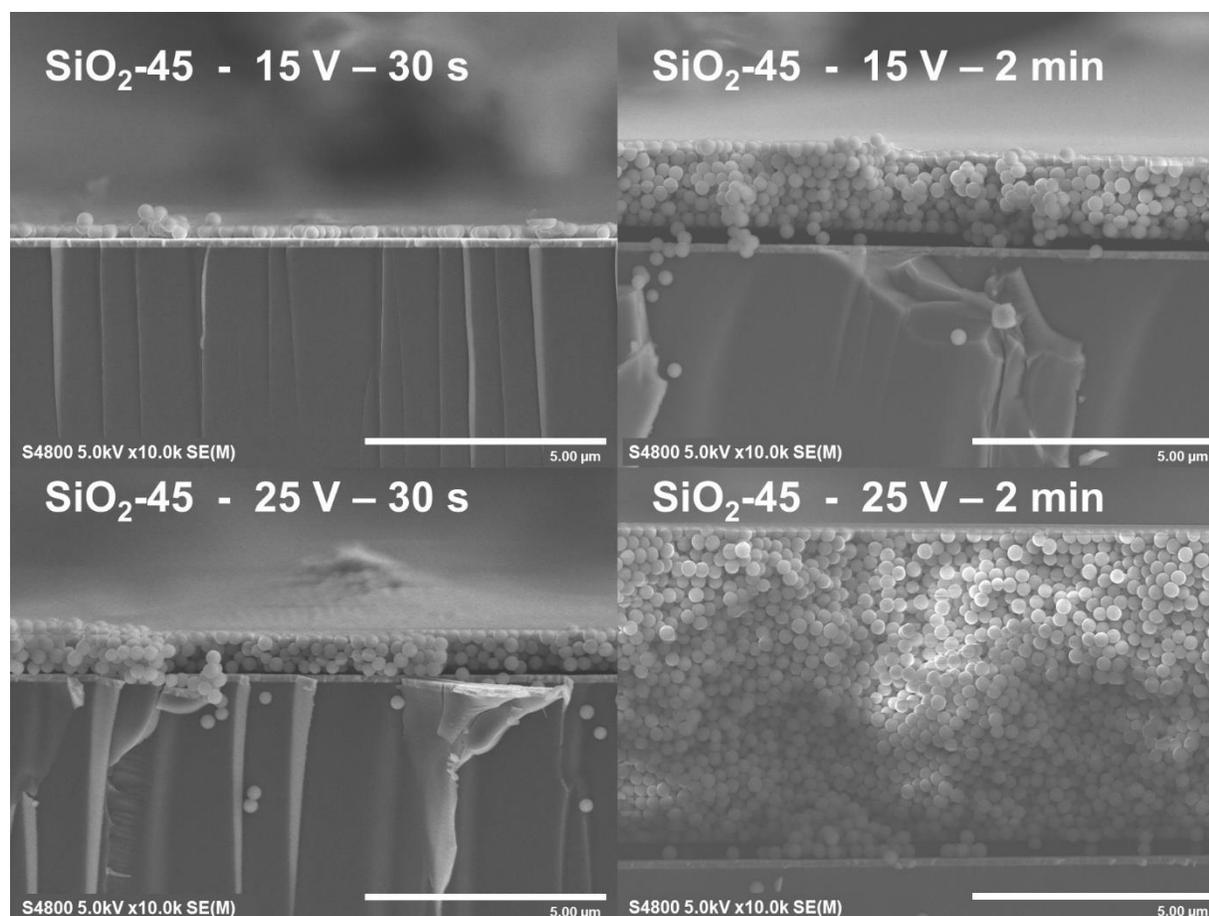


Figure S5. SEM images (cross-section) of EPD PCs fabricated on 2.5×1 cm rectangles ITO glass substrates, from an ethanol suspension containing 1 wt% of SiO₂ particles at different voltage and during different period of time (conditions are described on every picture). Scale bars have been redrawn for greater readability.

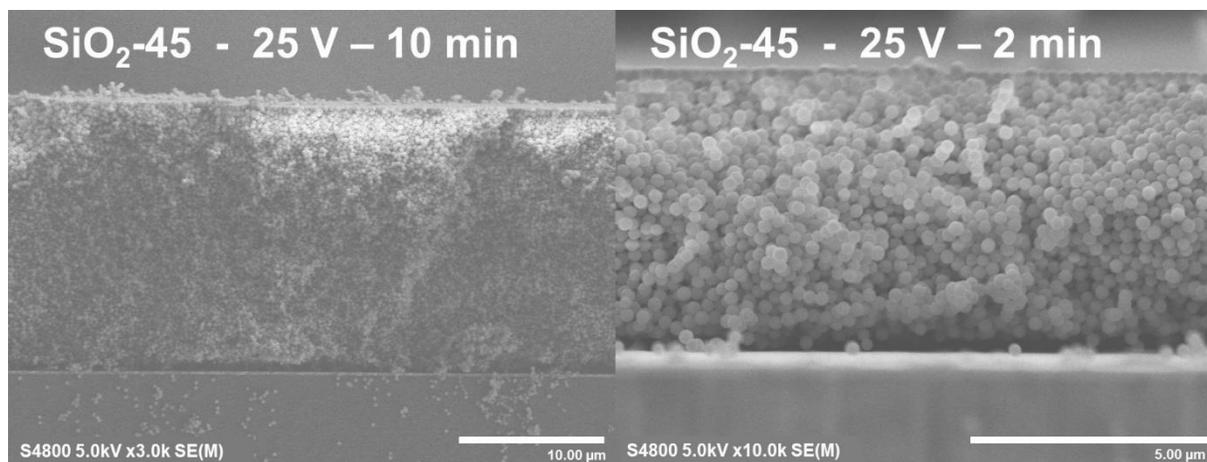


Figure S6. SEM images (cross-section) of EPD PCs fabricated on 2.5×1 cm rectangles ITO glass substrates (left) or 5×2.5 cm rectangles (right), from an ethanol suspension containing 1 wt% of SiO₂ particles at different period of time (conditions are described on every picture). Scale bars have been redrawn for greater readability.