Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Electronic Supplementary Material

The Extraordinary Optical Transmission and Sensing Properties of Ag/Ti Composite Nanohole Arrays

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At% Ti	Height of NH (h) (nm)	NH Diameter (nm)
100	50 ± 2	350 ± 20
97	51 ± 3	350 ± 20
95	50 ± 1	350 ± 20
92	52 ± 2	340 ± 10
90	48 ± 3	350 ± 10
85	50 ± 3	348 ± 5

Table S1: Morphological parameters extracted from AFM of the NH arrays.

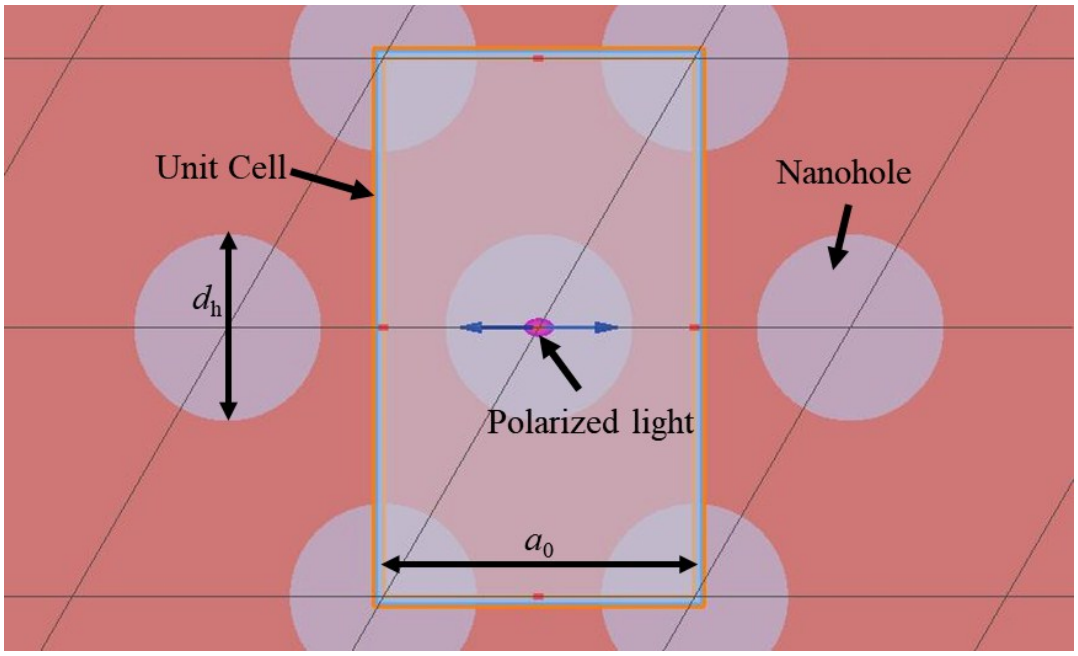

Figure S1: The configuration of the nanohole array used in the FDTD calculations. The lattice constant a_0 and hole diameter d_h were set as 500 and 300 nm, respectively, and the thickness was 50 nm. A rectangular unit cell (blue box) consisting of one hole in the center and four quartering holes at the four corners was used as the repeated calculation area to simulate an infinite film. The width and length of the unit cell were 500 and $500\sqrt{3}$ nm, respectively. A horizontally polarized incident light was used.

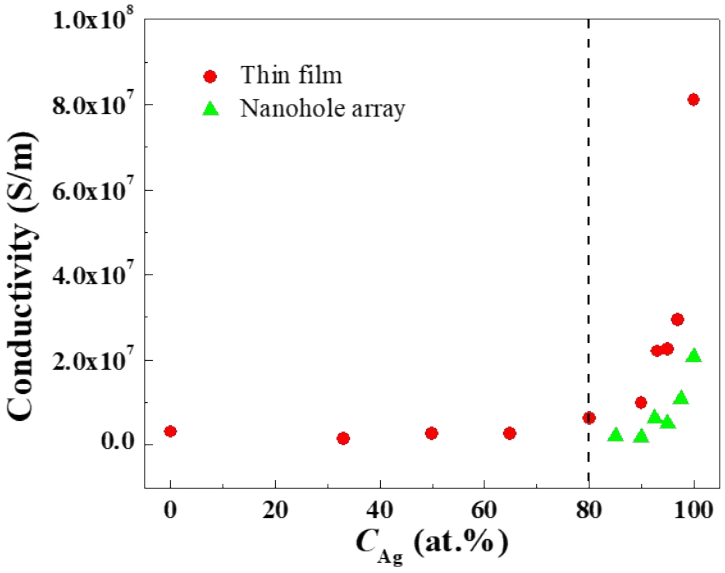

Figure S2: The plot of the measured conductivity of thin film and nanohole samples as a function of $C_{Ag.}$

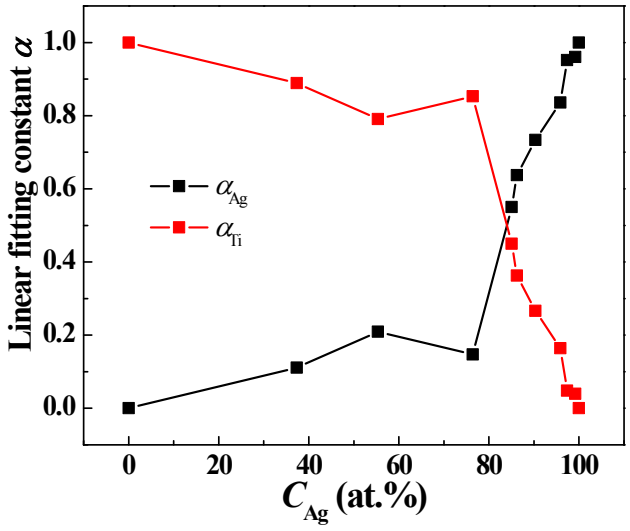

Figure S3: Linear fitting constants of the combined Drude Lorentz model for all of the composites as shown in the ellipsometry data in Figure 4.

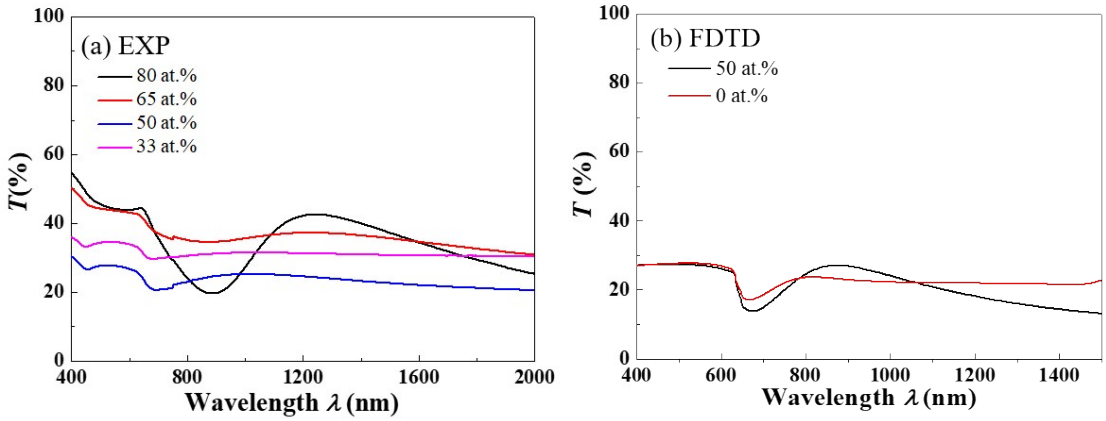

Figure S4: The transmission spectra $T(\lambda)$ of Ag/Ti nanohole arrays with low C_{Ag}: (a) experimental data and (b) selected FDTD results. All of them do not demonstrate significant EOT. The 80 at.% sample is an outlier possibly due to the loss of Ag percolation as the Ag concentration decrease below a threshold value, more work in this regime is needed

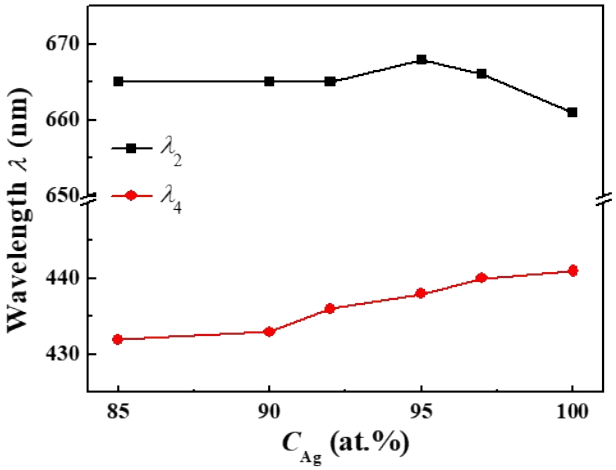

Figure S5: Plots of the experimentally obtained λ_2 and λ_4 as a function of C_{Ag}.

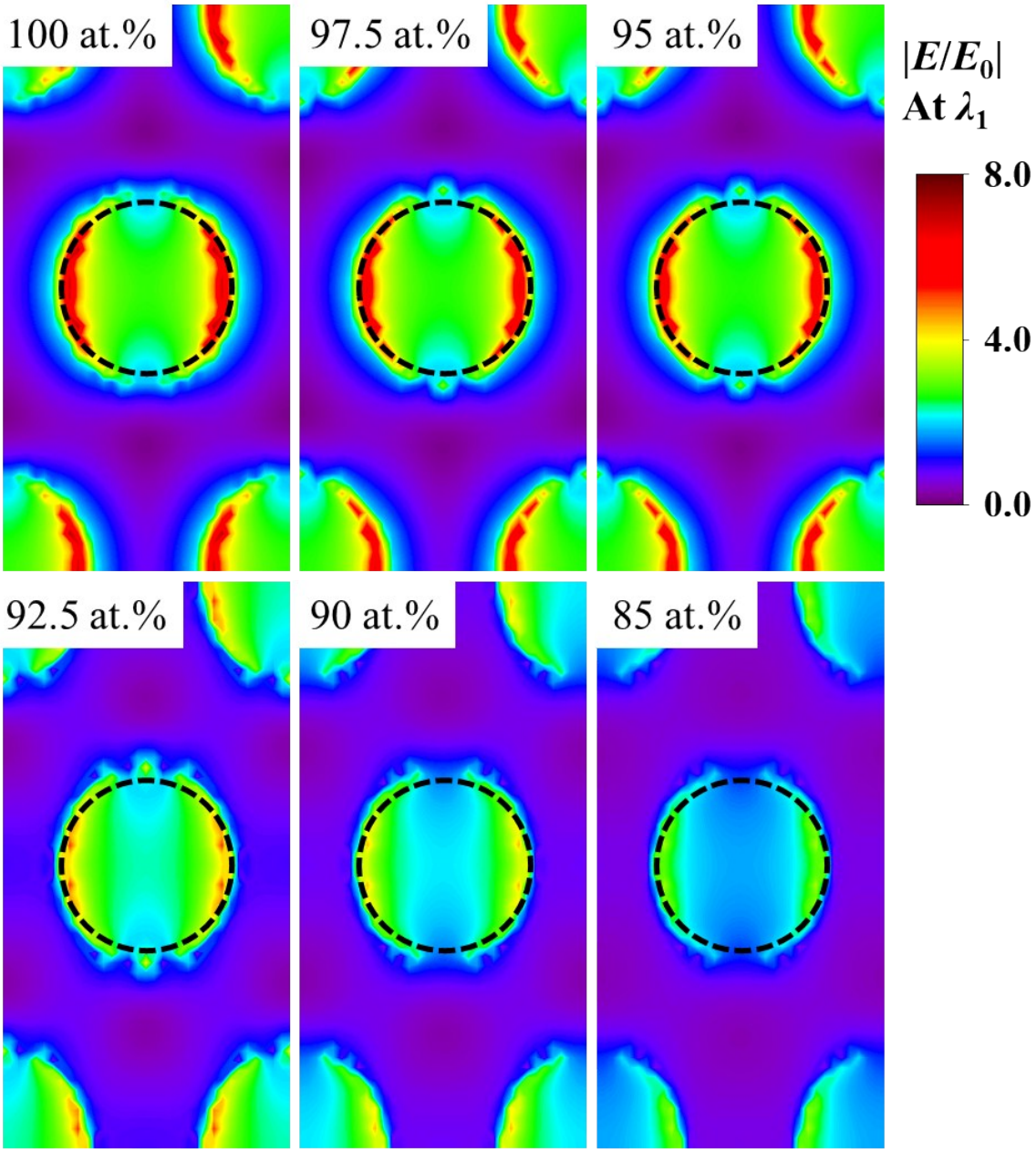

Figure S6: Top-views of the local electric field distributions at the Ag/glass interface of the Ag/Ti composite nanohole arrays with different C_{Ag}. The black dotted circles indicate the outline of the nanoholes.

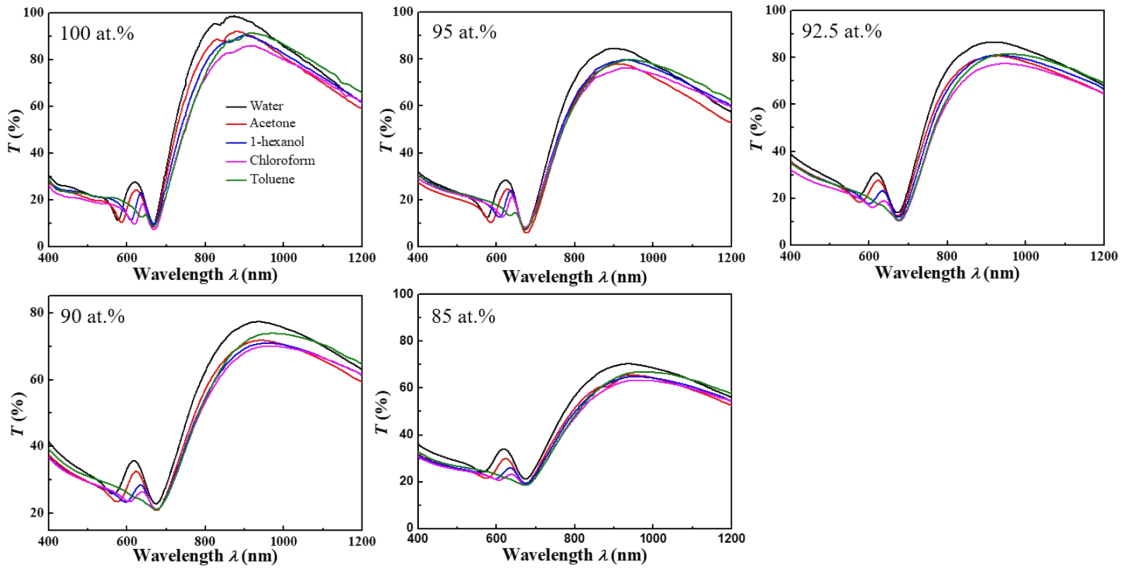

Figure S7: Transmission spectra $T(\lambda)$ of the Ag/Ti composite nanohole array with different C_{Ag} in different liquids.