

Electronic Supplementary Information (ESI)

Geometric effects of nano-hole arrays for label free bio-detection

Seunguk Kim,^a Jeong Hee Shin,^a Samhwan Kim,^b Seung-Jun Yoo,^b Byoung Ok Jun,^a Cheil Moon^b and Jae Eun Jang^{*a}

* E-mail: jang1@dgist.ac.kr

^aDepartment of Information and Communication Engineering, Daegu Gyeongbuk Institute of Science and Technology (DGIST), 333, Techno jungang-daero, Hyeonpung-myeon, Dalseong-gun, Daegu, 711-873, Korea

^bDepartment of Brain & Cognitive Sciences, Daegu Gyeongbuk Institute of Science and Technology (DGIST), 333, Techno jungang-daero, Hyeonpung-myeon, Dalseong-gun, Daegu, 711-873, Korea

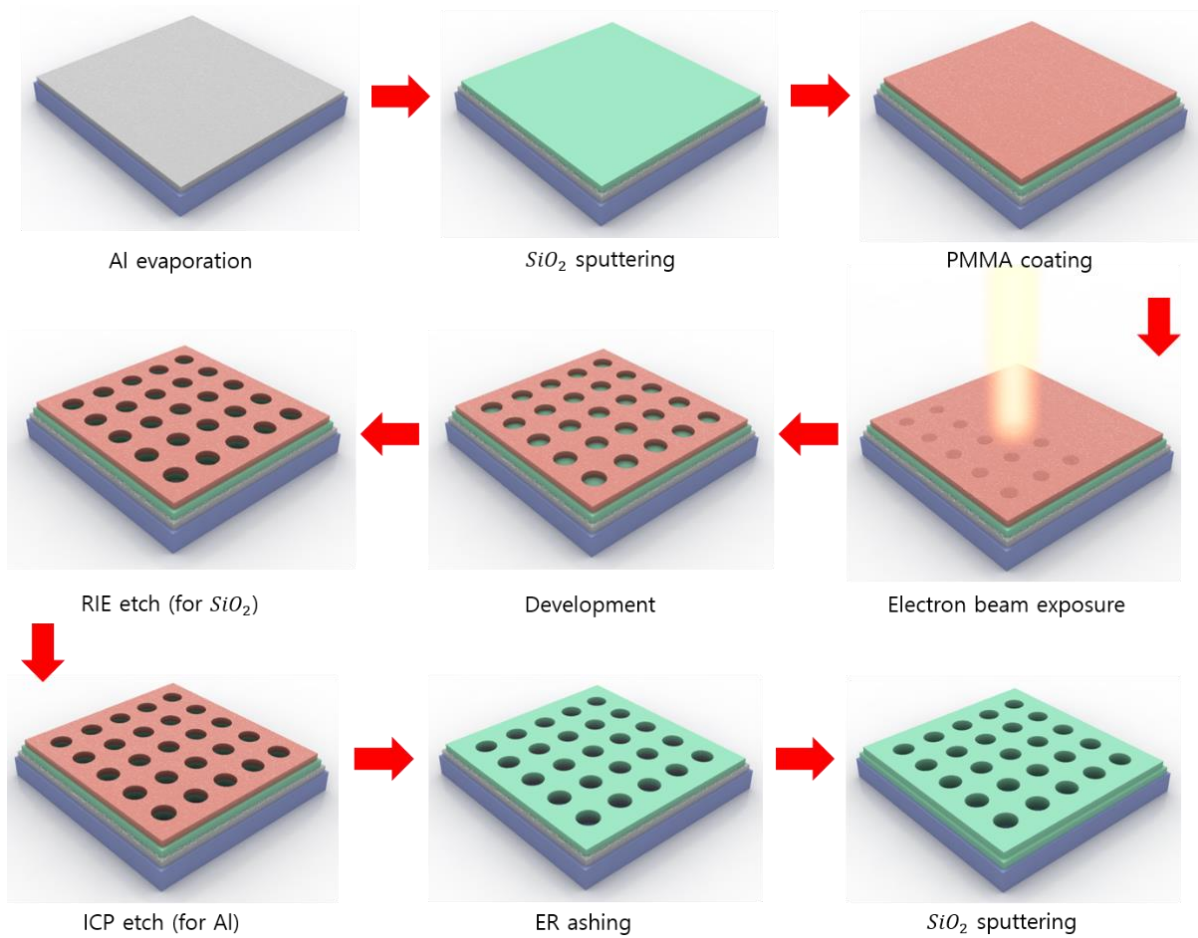


Fig. S1 Fabrication steps for our SCFs. 150 nm and 50 nm-thick Al and SiO_2 were deposited on the glass substrate. To form square structural hole arrays, electron beam lithography was performed. As following this step, RIE and ICP made patterns on SiO_2 and Al layers. Finally, Ultra-thin SiO_2 was deposited on samples.

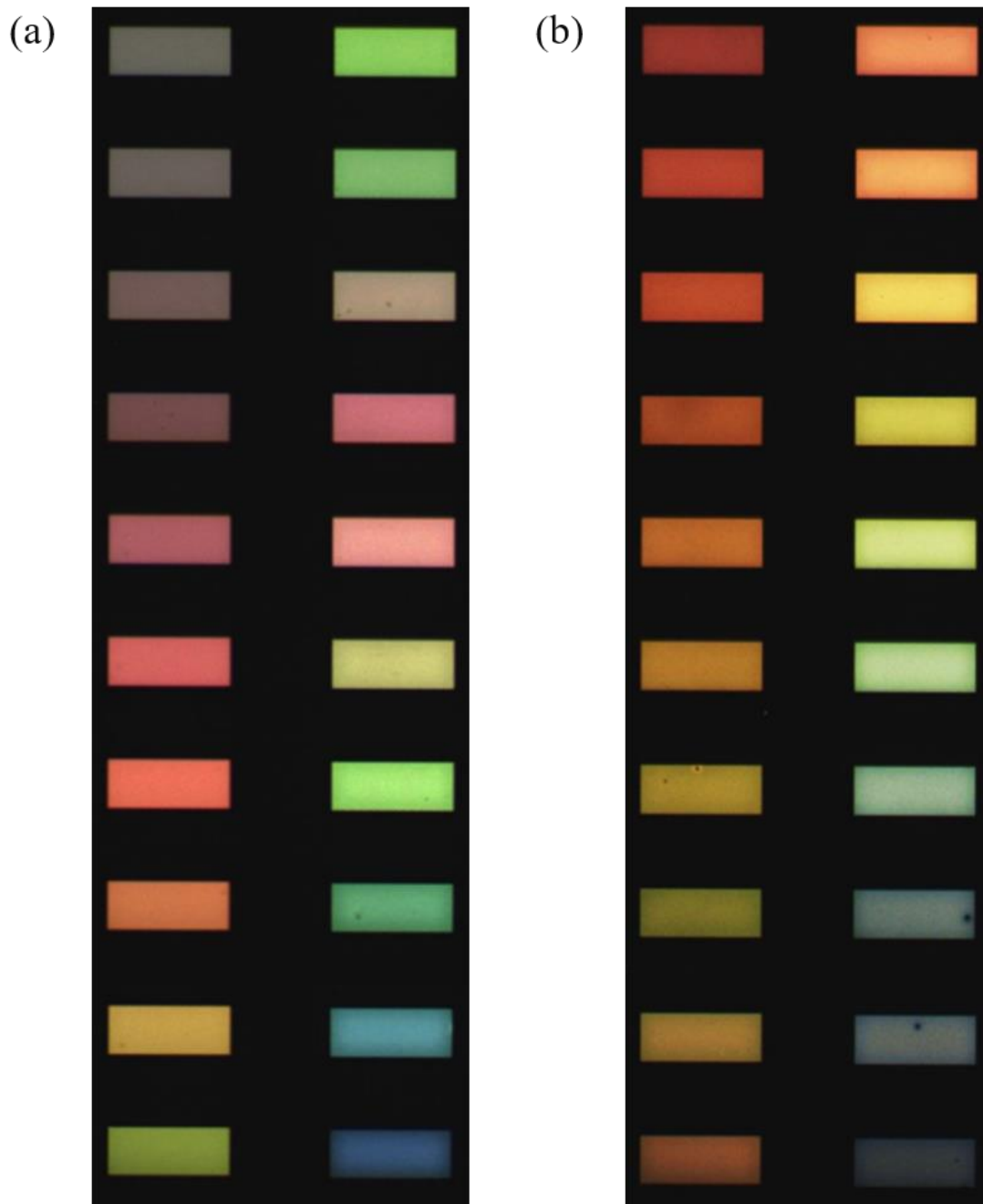


Fig. S2 Optical microscope (OM) images of SCFs with specific diameter (d) to spacing (s) ratios of (a) 0.4 and (b) 0.5. The spacing of each fabricated filter ranged from 750 to 275 nm with 25 nm step for (a) and from 640 to 260 nm with 20 nm step for (b). All filters consisted of circular holes which followed a triangular structure. Each filter has $50 \times 150 \mu\text{m}^2$.

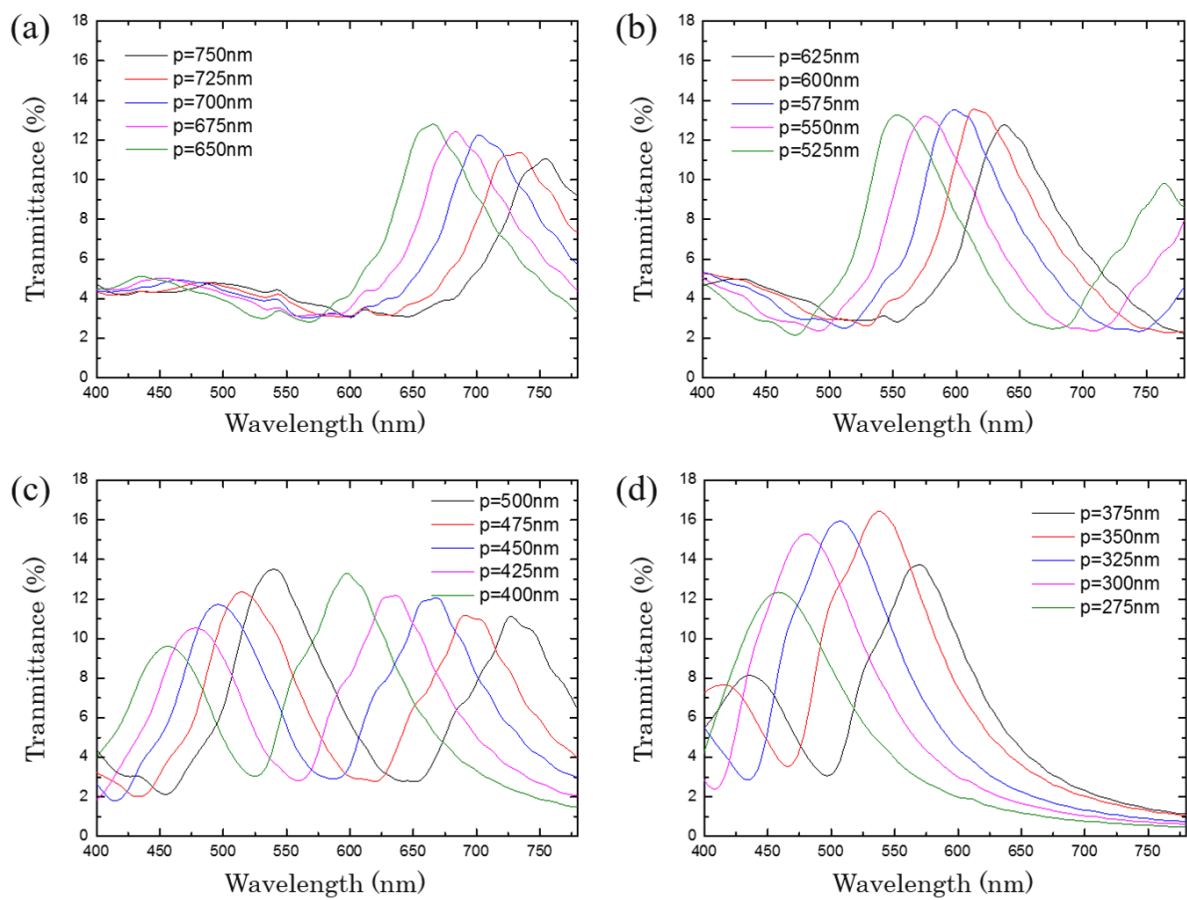


Fig. S3 Measured transmission spectra of the SCFs with a d/s ratio of 0.4.

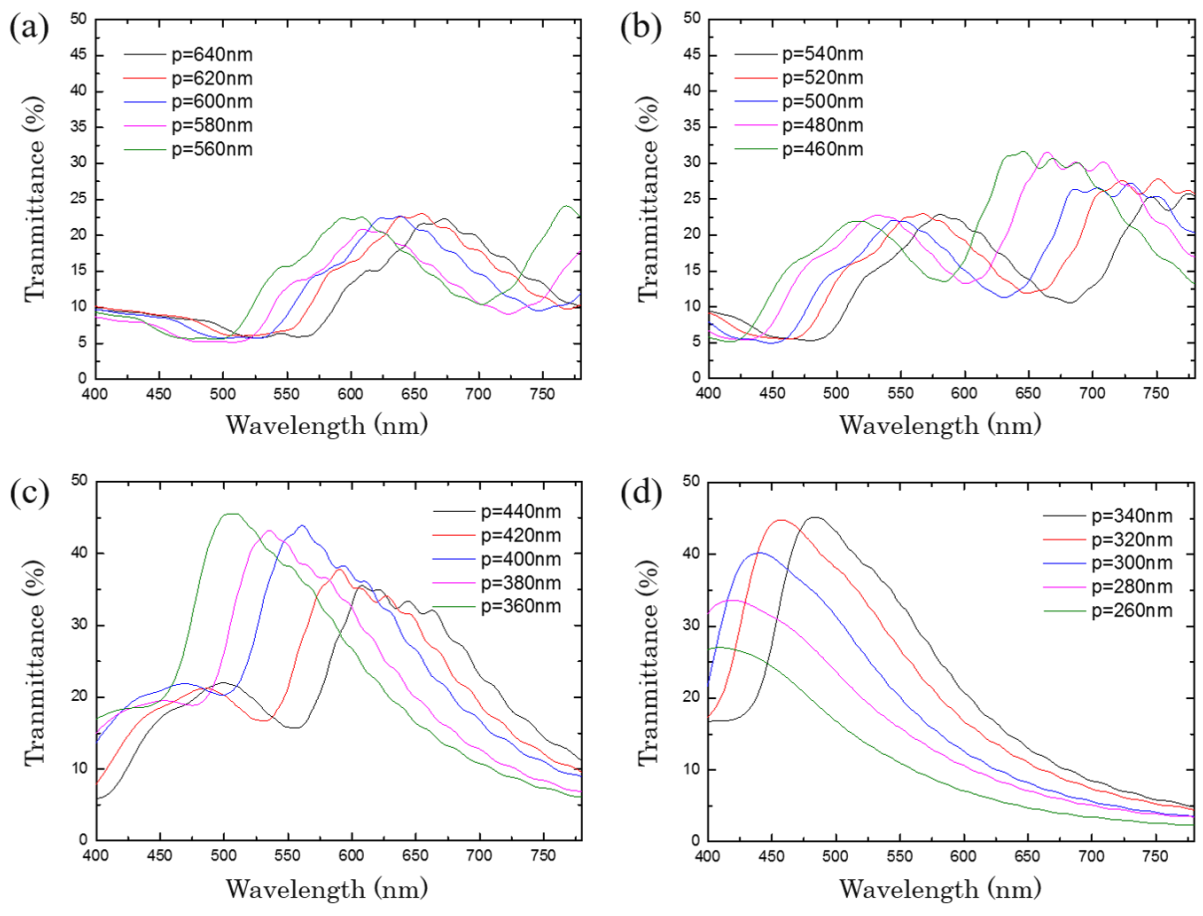
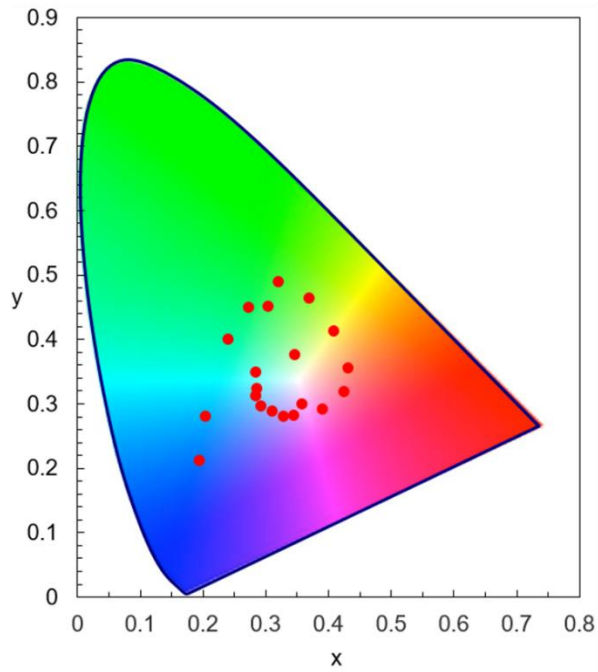
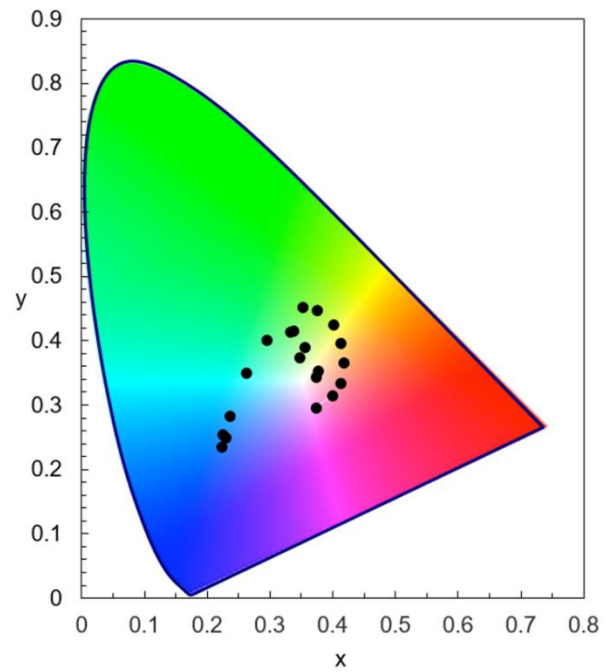


Fig. S4 Measured transmission spectra of the SCFs with a d/s ratio of 0.5.



(a)



(b)

Fig. S5 CIE 1931 chromaticity diagram plots of d/s ratios of (a) 0.4 and (b) 0.5. Both results indicate that SCFs consisted of a d/s ratio of 0.4 have shown enhanced results in color purity even though the brightness was suppressed.

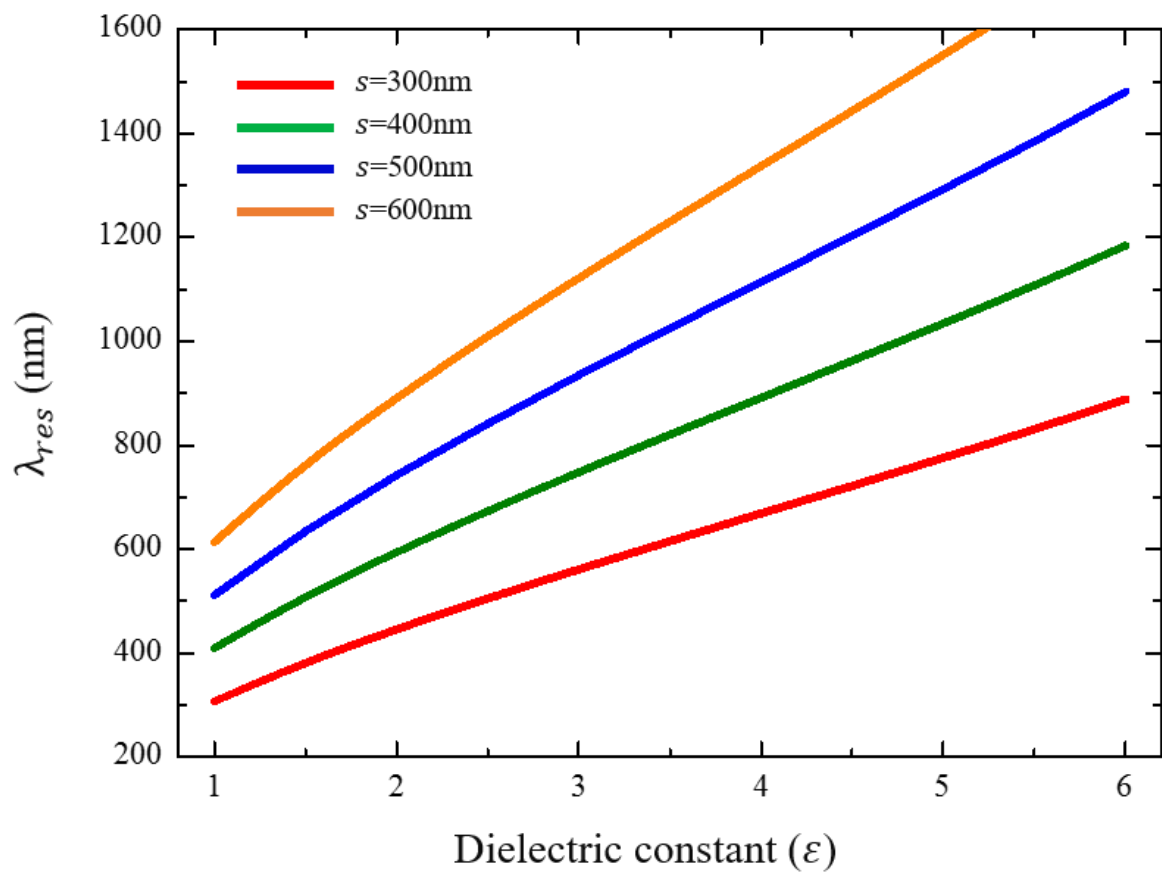


Fig. S6 The sensitivity of SCFs described in terms of various dielectric constants and spacing conditions of structures.