

Supplementary information

**Direct label-free detection of Rotavirus using
hydrogel based nanoporous photonic crystal**

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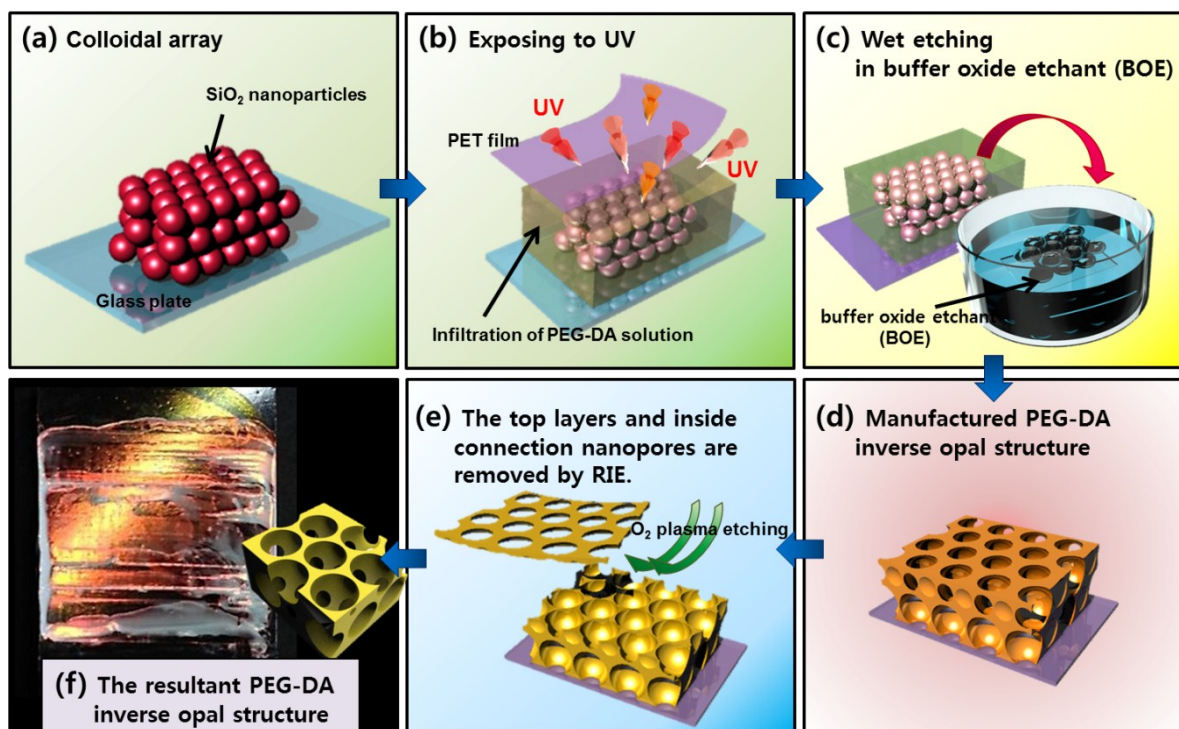


Figure S1. Scheme of the procedure for fabrication of O_2 plasma treated inverse opal sensor structure. (a) Colloidal crystal based silica (SiO_2) nanoparticles were dropped on a slide glass and it was covered with a piece of cover glass slide for self-assembly. After fully-evaporation, the silica beads were assembled to the shape of the face-centered cubic (FCC) structure. (b) The assembled structure was immersed into ethylene glycol diacrylate (PEG-DA) solution for 5 min. Then, a polyethylene terephthalate (PET) film, modified with urethane groups to increase adhesion to the acrylate-containing monomer was covered on it. This sample was exposed to UV (250~400nm) for a few tens of seconds 90 mW/cm². (c, d) An inverse opal structure was obtained by wet etching of the silica beads in buffer oxide etchant. (e) Fabricated inverse opal PC structure was treated by O_2 plasma etching in order to make ideal condition for virus impregnation.

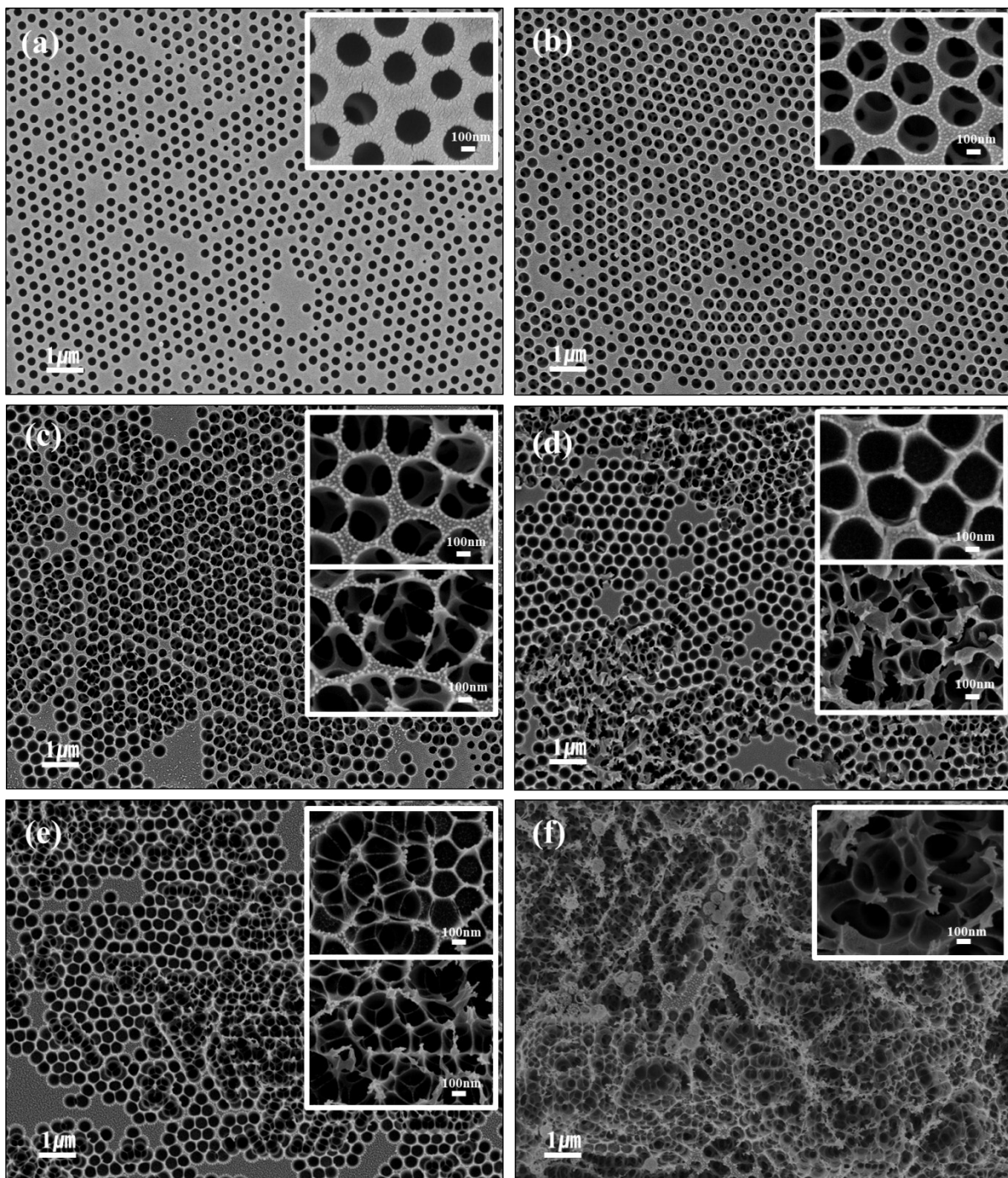


Figure S2. SEM images of the morphology of the inverse opal PC structure according to the O₂ plasma etching time. (a) shows the original PC structure and (b)-(f) are images of structure treated for 30sec, 1, 2, 3, and 8min by O₂ plasma, respectively. The supplied power is 100 W

As shown SEM images of figure S2, when plasma etching (100 W power) was conducted more than one minute, backbone of the structure became demolished. Therefore, the collapse of structure

became so severe that the periodicity in PC structures was disappeared. In conclusion, 30 second reaction time is chosen as the perfect time in order to not only produce the structure which has the enlarged connection window between nanopores but also maintain the periodic characteristics in PC structures.