Supporting Information

**Gold Nanoshell Arrays-Based Visualized Sensors of pH : Facile Fabrication and High Diffraction Intensity**

D.D. Men, F. Zhou, H.L. Li,L.F. Hang, X.Y. Li, D.L Liu, W.P. Cai,

*Key Lab of Materials Physics, Anhui Key Lab of Nanomaterials and Nanotechnology, Institute of Solid State Physics, Chinese Academy of Sciences, Hefei 230031, P. R. China*

D.D. Men

*Collegeof Chemistry Chemical Engineering and Materials Science, HanDan University, Hadan, 056005, P. R. China*

L.M. Qi

*College of Chemistry, Peking University, Beijing 100871, P. R. China*

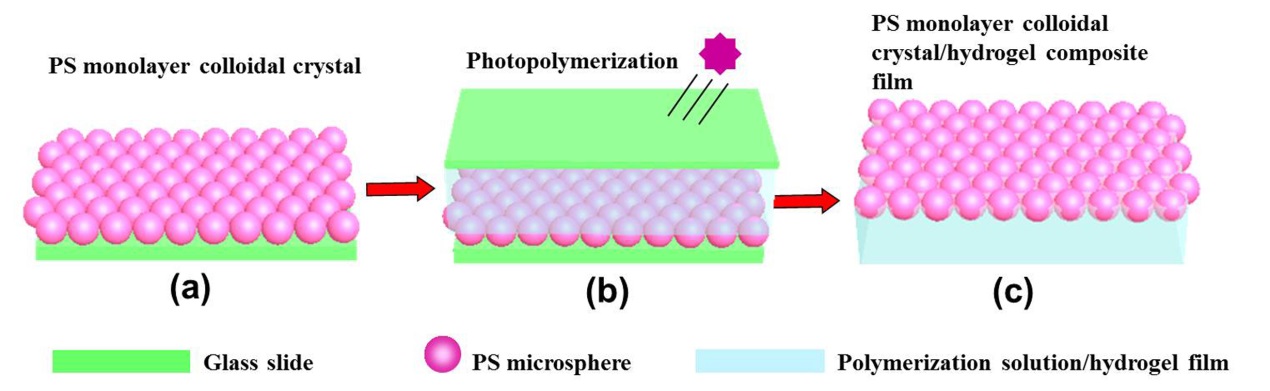
L.B. Li

*National Synchrotron Radiation Lab and College of Nuclear Science and Technology, CAS Key Lab of Soft Matter Chemistry, University of Science and Technology of China, Hefei, 230026, P. R. China*

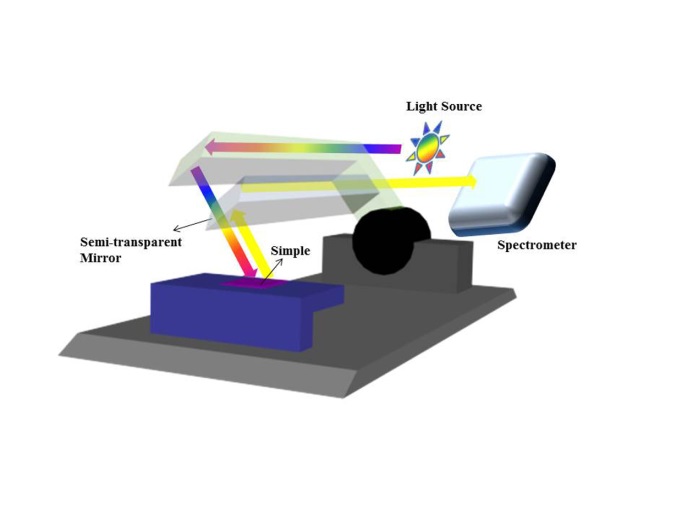
Y. Li

*Key Lab of Materials Physics, Anhui Key Lab of Nanomaterials and Nanotechnology, Institute of Solid State Physics, Chinese Academy of Sciences, Hefei 230031, P. R. China*

*E-mail:* [*yueli@issp.ac.cn*](mailto:yueli@issp.ac.cn)



**FIG. S1.** Preparation of the 2D PS colloidal crystal/hydrogel composite film: (a) 2D PS microsphere colloidal crystal was fabricated on a cleaned glass slide by an air/water interfacial self-assembly method; (b) Polymerization solution was cast on the 2D PS microsphere colloidal crystal and then photopolymerized into hydrogel by UV light; (c) A free-standing 2D PS colloidal crystal/hydrogel composite film was obtained by peeling it off from the substrates.



**FIG. S2.** Schematic of diffraction spectra measurement.