Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.
This journal is © the Owner Societies 2015

Supporting Information

Surface-enhanced Raman Scattering Behaviour of 4-Mercaptophenylboronic Acid on Assembled Silver Nanoparticles

Shuangshuang Li[a,b], Qun Zhou[a,*], Wenya Chu[a], Wei Zhao[a], Junwei Zheng[a,b,*]

[a] College of Chemistry, Chemical Engineering and Materials Science, and Soochow University, Suzhou 215123, P. R. China;

[b] College of Physics, Optoelectronics and Energy, Soochow University, Suzhou 215006, P. R. China.

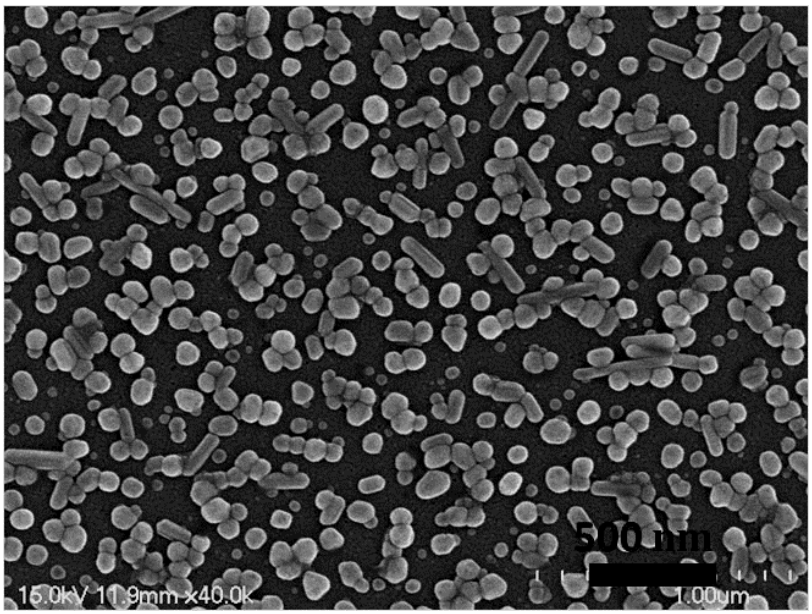

Fig. S1 SEM graph of self-assembled AgNPs

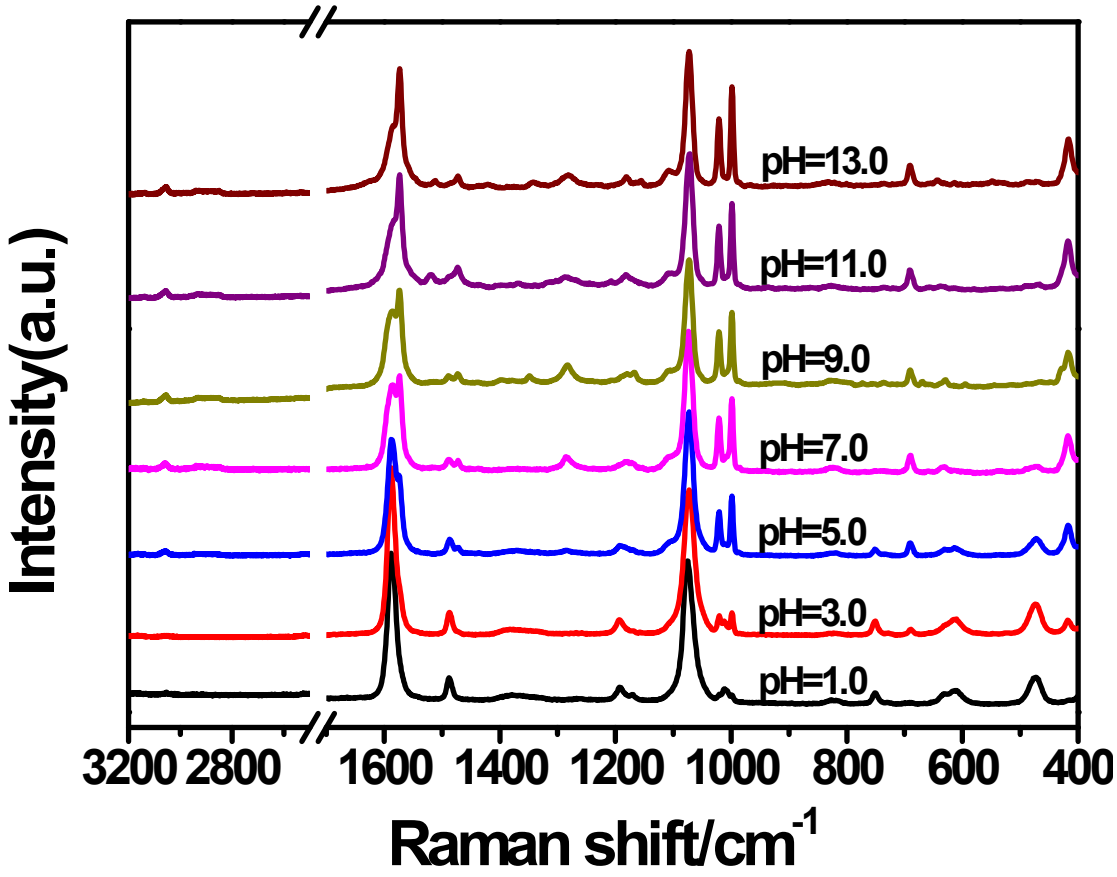

Fig. S2 SERS spectra of MPBA in solutions with different pH values.

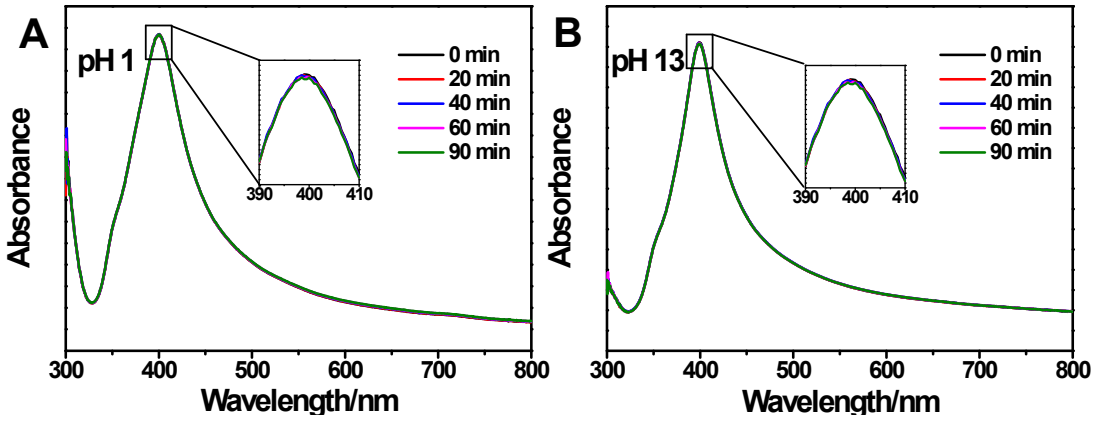

Fig. S3 UV-Vis spectra of AgNPs assembled on glass slide in (A) pH 1 and (B) pH 13 solution the extension of immersed time

To confirm the stability of AgNPs in pH 1 and 13 solution, we conducted the experiments to measure the time dependent behaviours of the UV-Vis absorption spectra of the AgNPs on slides in pH 1 and pH 13 solutions. The results (Fig. S3) demonstrate that the assembled AgNPs are quite stable both in acidic and basic media as indicated by stable intensity of the SPR band.

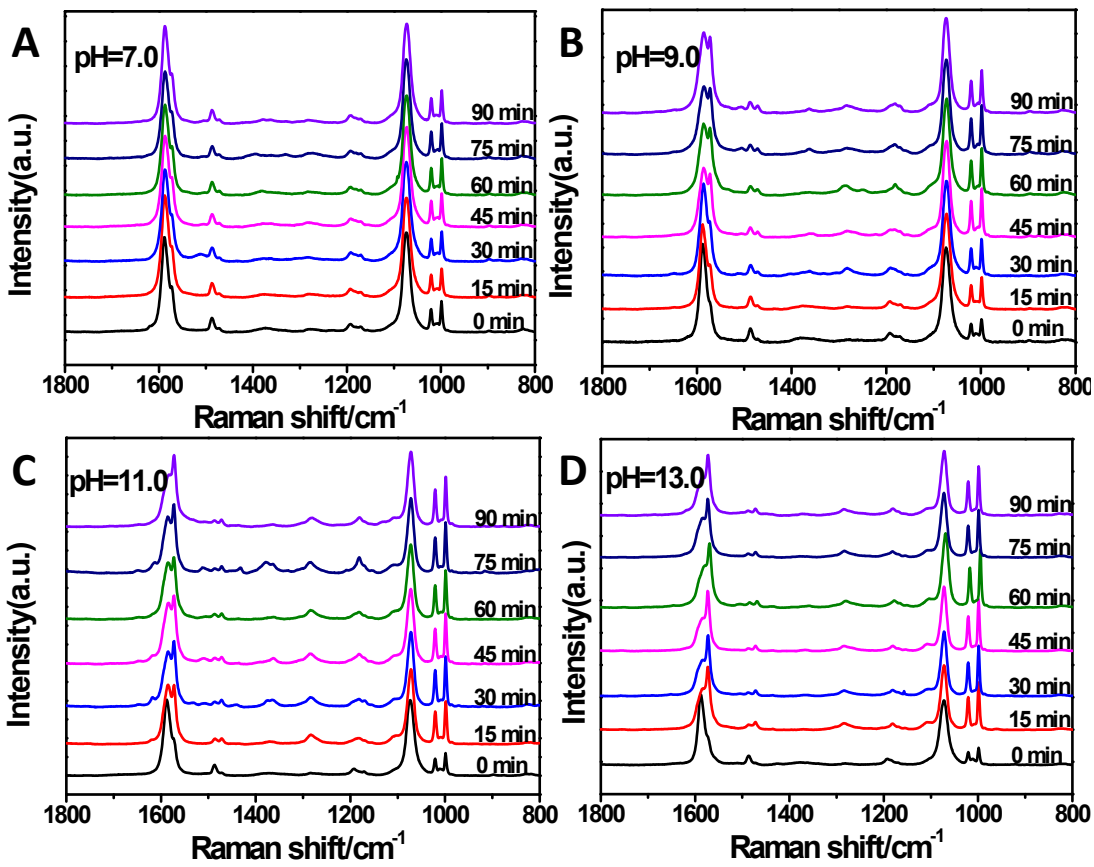

Fig. S4 SERS spectra of MPBA measured in pH 1.0 solution. Before each SERS measurements, the substrates were immersed in various pH solutions for different time: (A) pH 7.0, (B) pH 9.0, (C) pH 11 and (D) pH 13.

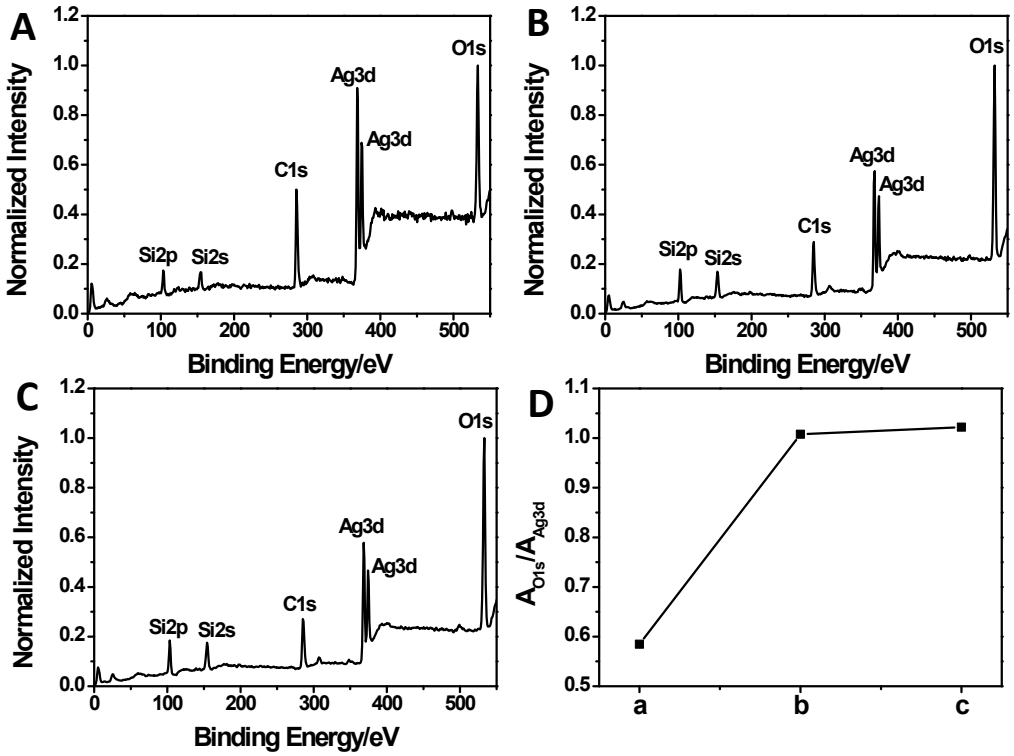

Fig. S5 XPS spectra of (A) Ag/MPBA, (B) Ag/MPBA-D-glucose, and (C) Ag/MPBA-D-glucose after the treatment with pH 1 solution, (D) Area ratio of the bands of O1s and Ag3d.

The XPS measurements of Ag/MPBA, Ag/MPBA-D-glucose, and Ag/MPBA-D-glucose after the treatment with pH 1 solution for 5 min were conducted and the corresponding results are shown in Fig. S5. The Si2s and Si2p bands from the glass substrate, the Ag3d bands from silver nanoparticles, and the C1s and O1s bands from bonded organics can be clearly observed. As comparing Fig. S5 A and B, the increase in the intensity of O1s band relative to Ag3d band would reflect the binding of D-glucose, due to relatively large content of O in D-glucose ($C_6H_{12}O_6$). The area ratio of the bands of O1s to Ag3d (A_{O1s}/A_{Ag3d}) depicted Fig. S5D, increases from 0.58 to 1.0 after adsorbed boronic acid reacted with 5 mM D-glucose, indicating the formation of D-glucose-MPBA. After the D-glucose-MPBA substrate was treated with a pH 1 solution, the XPS spectrum obtained (Fig. S5C) is similar to that in Fig. S5B, and the values of A_{O1s}/A_{Ag3d} are comparable, suggesting that the MPBA-D-glucose species is stable at pH 1.0.