Supplementary Material (ESI) for Analyst

Humic acids-based one-step fabrication of SERS substrates for detection of polycyclic aromatic hydrocarbons

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The Supplementary Material includes:

Three figures (Fig. S1, S2, S3)

Two tables (Table S1, S2)

Two texts (Text S1, S2)

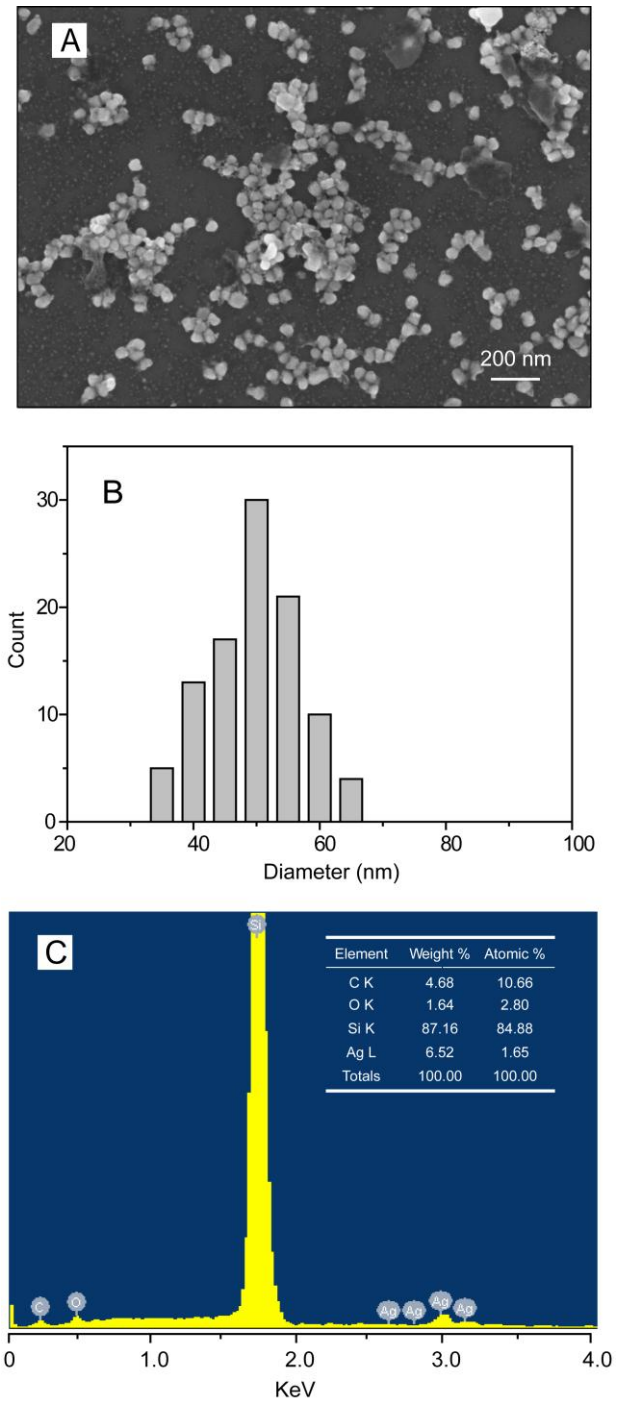

Fig. S1 (A) A representative SEM of HAs-Ag NPs acquired from the silicon wafer. (B) Size distribution of 100 HAs-Ag NPs selected randomly from the representative SEM image. (C) The EDAX spectrum of HAs-Ag NPs recorded from on the silicon wafer, inset: the content analysis of the HAs-Ag NPs.

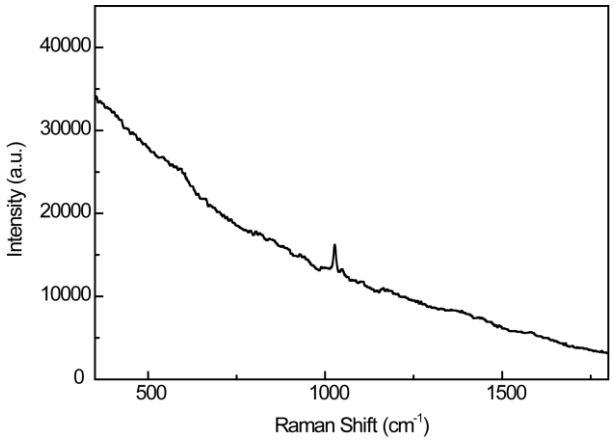

Fig. S2 The Raman spectrum of HAs-Ag NPs prepared with HAs.

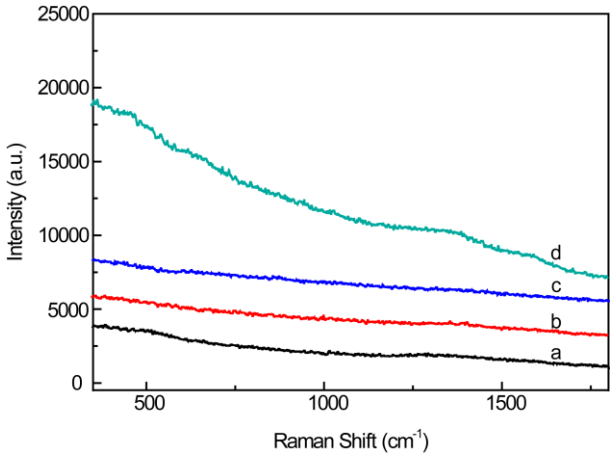

Fig. S3 SERS spectra of (a) anthracene, (b) fluoranthene, (c) pyrene and (d) 3, 4-benzopyrene acquired from citric-capped Ag NPs .

Table S1 Surface-enhanced Raman bands of anthracene, fluoranthene, pyrene and 3, 4-benzopyrene.[1-7]

anthracene	fluoranthene	pyrene	3,4-benzopyrene
389 skeletal deformation	470 skeletal stretching	401 skeletal stretching	327 skeletal deformation
476 skeletal deformation	553 skeletal stretching	452 skeletal stretching	513 skeletal stretching
658 C-H stretching	665 C-H stretching	512 skeletal deformation	605 C-H stretching
756 stretching	795 C-H stretching	585 skeletal stretching	632 C-H stretching
1002 C-C stretching	1013 C-C stretching	629 C-H stretching	1015 C-H in-plane bending
1163 C-C stretching	1097 C-H in-plane bending	1061 C-H in-plane bending	1207 C-H in-plane bending
1183 C-C stretching	1262 C-H in-plane bending	1138 C-H in-plane bending	1233 C-H in-plane bending
1236 C-C stretching	1406 ring vibration	1236 C-H in-plane bending	1383 C-C stretching
1400 ring stretching	1414 C-C stretching	1401 C-C stretching	1404 C-C stretching
1479 C-C stretching	1450 C-C stretching	1589 C-C stretching	1421 C-C stretching
1561 C-C stretching	1605 C-C stretching	1626 C-C stretching	1576 C-C stretching
		1640 C-C stretching	1618 C-C stretching

Table S2 Surface-enhanced Raman bands of the mixture sample.

Mixture sample	327	470	585	658	665	756	1037	1061	1163	1097	1236	1383	1400	1561
Anthracene				√		√			√		√		√	√
Fluoranthene		√			√					√				
Pyrene			√					√			√		√	
3, 4-benzopyrene	√						√					√		

Text S1

The citric-capped Ag NPs were prepared as the traditional Lee and Meisel method. In brief, 18 mg of silver nitrate was dissolved in 100 mL deionized water at room temperature and brought to boiling before 8 mL of 1.00 wt.% sodium citrate solution was added under vigorous stirring. The solution was kept on boiling for an additional 25 min, after that, it was cooled to the room temperature.

Text S2

SERS measurements of PAHs using citric-capped Ag NPs. Aliquots of PAHs solutions were added to NaCl-activated citric-capped Ag NPs colloids to achieve the final concentration of 10^{-6} M. Afterwards, 10 μL samples were placed on a silicon wafer under ambient conditions, dried with air, and then subjected to SERS measurements."

References

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