

Supporting Information

Simultaneous SERS Detection of Multiple Amino Acids Using ZIF-8@AuNPs as Substrate: Classified with 1D Convolutional Neural Network

Mengping Huang ¹, Shuai Ma ¹, Jinrong He ¹, Wei Xue ¹, Xueyan Hou ¹, Yuqi Zhang ^{1,*},
Xiaofeng Liu ^{2,*}, Heping Bai ³ and Ran Li ^{1,*}

¹ Yan'an Key Laboratory of Green Chemistry Energy, Key Laboratory of New Energy & New Functional Materials, Shaanxi Key Laboratory of Chemical Reaction Engineering, College of Chemistry and Chemical Engineering, College of Mathematics and Computer Science, Yan'an University, Yan'an 716000, China; hmp0526@163.com (M.H.); ms_sxx@163.com (S.M.); hejinrong@yau.edu.cn (J.H.); xuwei@yau.edu.cn (W.X.); xueyan12457@163.com (X.H.)

² Guangxi Key Laboratory of Urban Water Environment, Baise University, Baise 533000, China

³ Experimental and Practical Education Innovation Center, Beijing Normal University at Zhuhai, Zhuhai 519000, China; baiheping@bnu.edu.cn

* Correspondence: yqzhang@iccas.ac.cn (Y.Z.); xfliu.1988@163.com (X.L.); lirandeqhd@vip.163.com (R.L.)

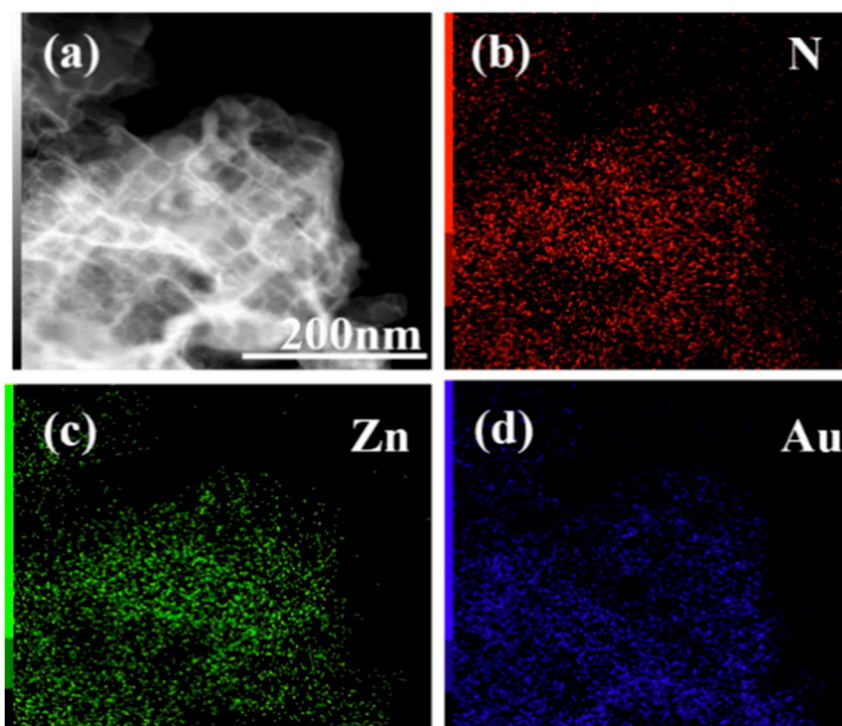


Figure S1. TEM image of ZIF-8@AuNPs (a) and the corresponding elemental mapping of N (b), Zn (c) and Au (d).

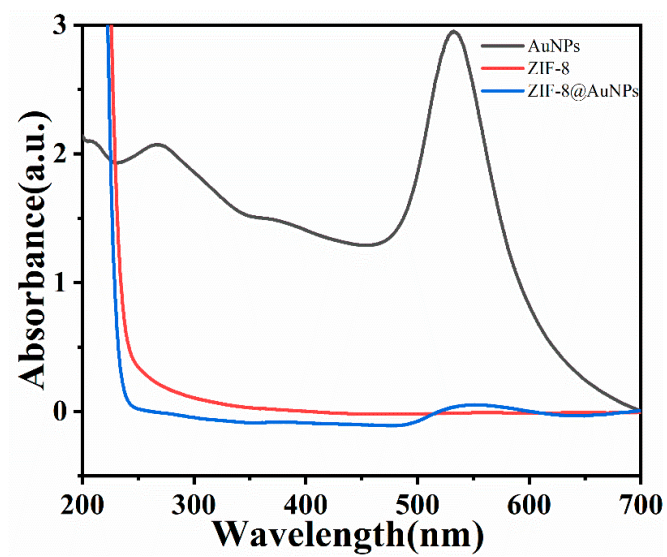


Figure S2. UV-vis absorption spectra of AuNPs, ZIF-8, and ZIF-8@AuNPs.

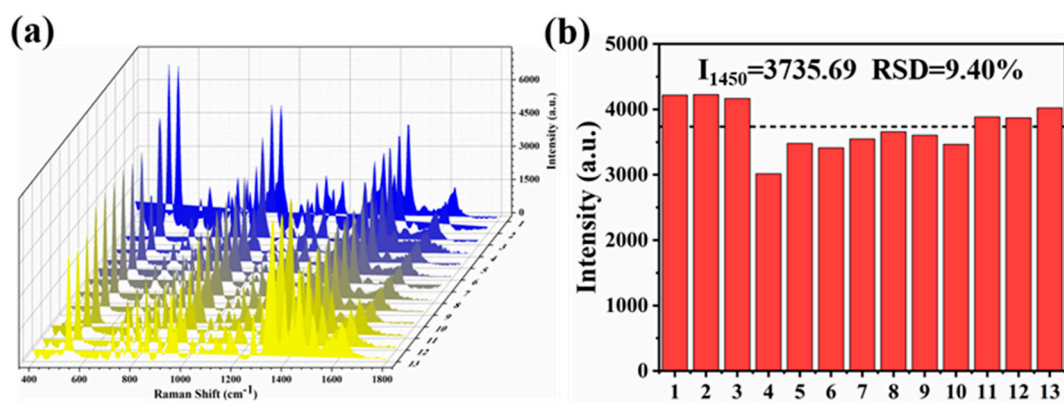


Figure S3. (a)SERS spectra of Val obtained from 13 random sites on the substrate, and (b) Distribution for all the 13 SERS intensity.

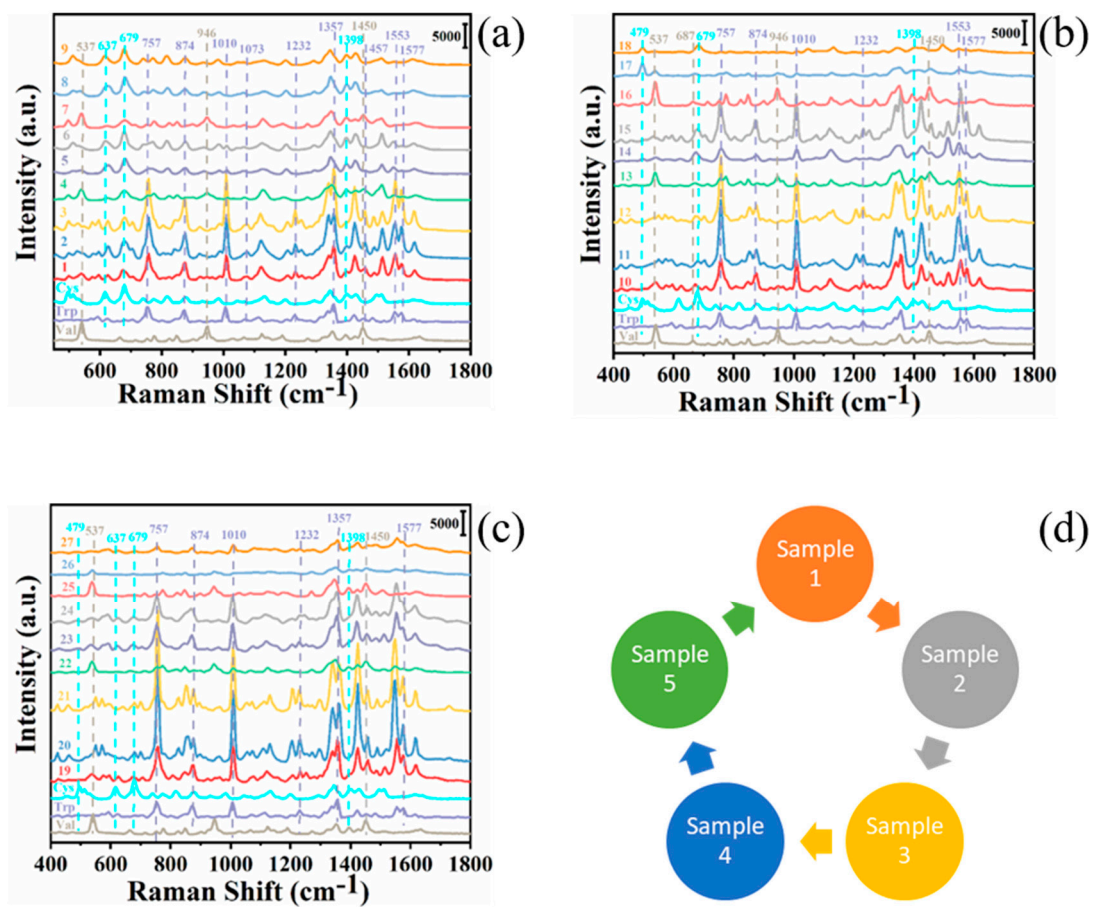


Figure S4. SERS spectra of 27 sets of mixtures(a-c), and Schematic diagram of the five-fold cross analysis validation method (d).

Table S1. Detailed concentration information for 27 sample sets.

Number of sample set	Cys	Trp	Val
00	10^{-1} M	10^{-1} M	10^{-1} M
01	10^{-1} M	10^{-1} M	10^{-2} M
02	10^{-1} M	10^{-1} M	10^{-3} M
03	10^{-1} M	10^{-2} M	10^{-1} M
04	10^{-1} M	10^{-2} M	10^{-2} M
05	10^{-1} M	10^{-2} M	10^{-3} M
06	10^{-1} M	10^{-3} M	10^{-1} M
07	10^{-1} M	10^{-3} M	10^{-2} M
08	10^{-1} M	10^{-3} M	10^{-3} M
09	10^{-2} M	10^{-1} M	10^{-1} M
10	10^{-2} M	10^{-1} M	10^{-2} M
11	10^{-2} M	10^{-1} M	10^{-3} M
12	10^{-2} M	10^{-2} M	10^{-1} M
13	10^{-2} M	10^{-2} M	10^{-2} M
14	10^{-2} M	10^{-2} M	10^{-3} M
15	10^{-2} M	10^{-3} M	10^{-1} M
16	10^{-2} M	10^{-3} M	10^{-2} M
17	10^{-2} M	10^{-3} M	10^{-3} M
18	10^{-3} M	10^{-1} M	10^{-1} M
19	10^{-3} M	10^{-1} M	10^{-2} M
20	10^{-3} M	10^{-1} M	10^{-3} M
21	10^{-3} M	10^{-2} M	10^{-1} M
22	10^{-3} M	10^{-2} M	10^{-2} M
23	10^{-3} M	10^{-2} M	10^{-3} M
24	10^{-3} M	10^{-3} M	10^{-1} M
25	10^{-3} M	10^{-3} M	10^{-2} M
26	10^{-3} M	10^{-3} M	10^{-3} M