Supplementary Material

Se, S, N doped carbon dots based AuNPs for the recognition of 6-methyl nicotine in e-cigarettes by surface-enhanced Raman scattering

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Experimental Section

Assessment of and interference

To validate the method's interference resistance, interfering substances present in e-cigarette oils samples were simultaneously identified. Interference resistance tests were conducted by introducing various potential interfering agents into the AuNPs/Se-CDs + 6-methyl nicotine (6-MN) system. These included nicotine, potassium chloride (KCl), sodium chloride (NaCl), calcium chloride ($CaCl_2$), aluminum chloride ($AlCl_3$), L-Cystine (L-Cys), alanine (Ala), D-Tyrosine (D-Tyr), leucine (Leu), maltose, glucose (Glu) at a concentration 20-fold higher than that of 6-MN.

Detection of 6-MN in e-cigarette oil samples using AuNPs/Se-CDs

In a typical procedure, spiked samples were prepared by fortifying purified e-liquid with 6-MN at varying concentrations (0.40, 4.00, and 40.00 ng/mL). Each prepared spiked sample was individually introduced into a 0.3 mg/mL AuNPs/Se-CDs dispersion. The resulting reaction mixtures were incubated at room temperature for 10 minutes, and alterations in Raman intensity at the 811 cm^{-1} band were monitored under excitation with a 785 nm laser. All experiments were performed in triplicate to ensure reproducibility.

Figures and Tables

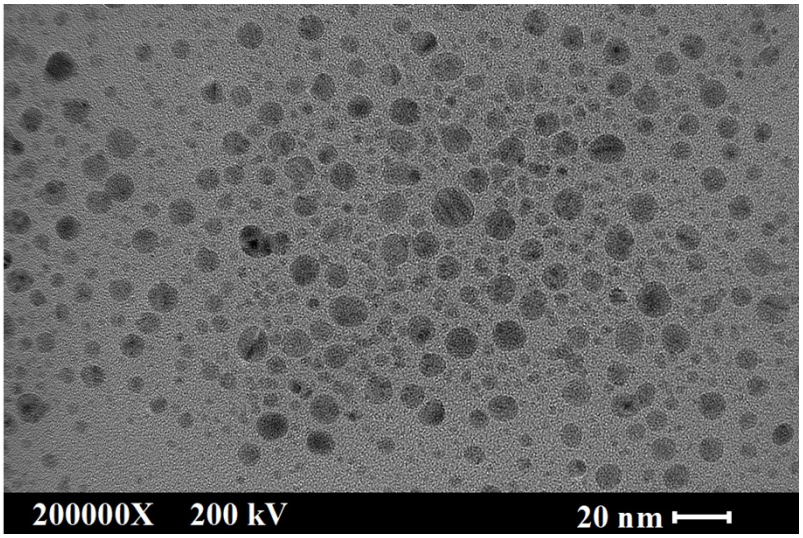

Fig S1 TEM image of AuNPs/Se-CDs (**Fig. 1a** original image).

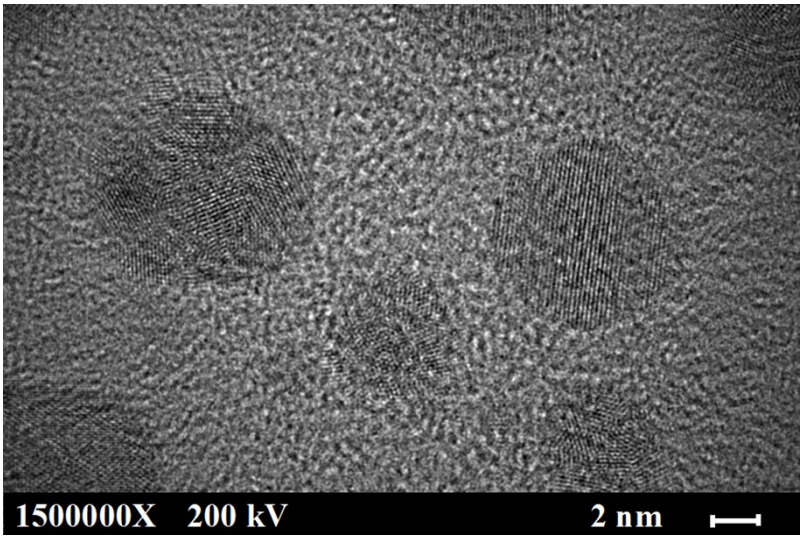

Fig S2 HRTEM image of AuNPs/Se-CDs (Original image of the inset in **Fig. 1a**).

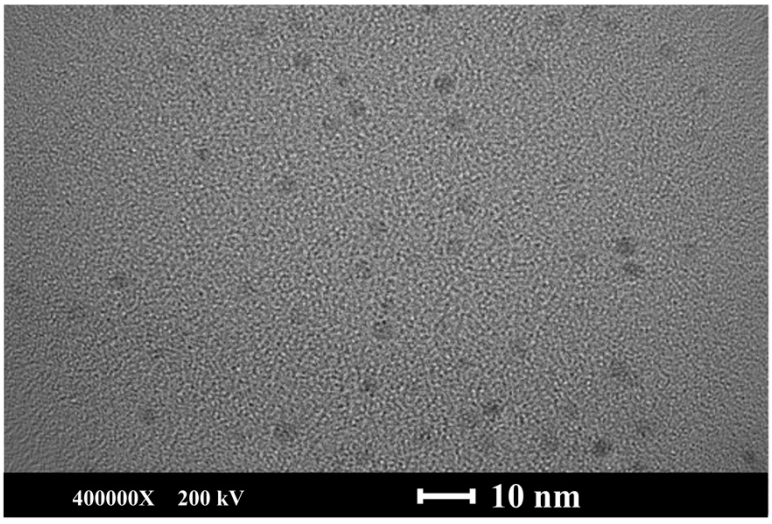

Fig S3 TEM image of S,Se,N-CDs.

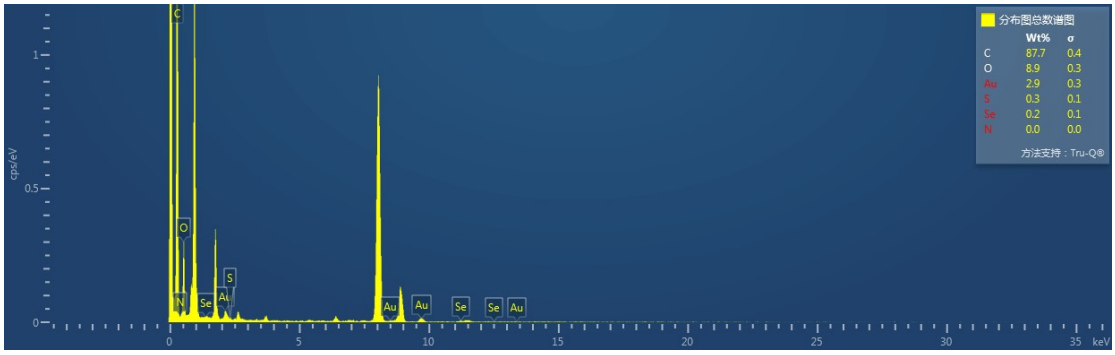

Fig S4 EDS elemental mapping of the prepared AuNPs/Se-CDs.

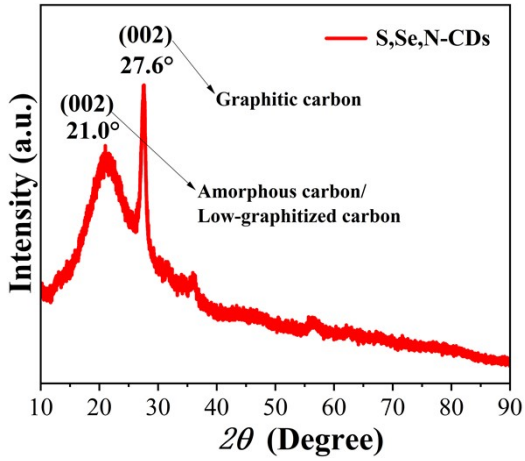

Fig S5 XRD image of S,Se,N-CDs.

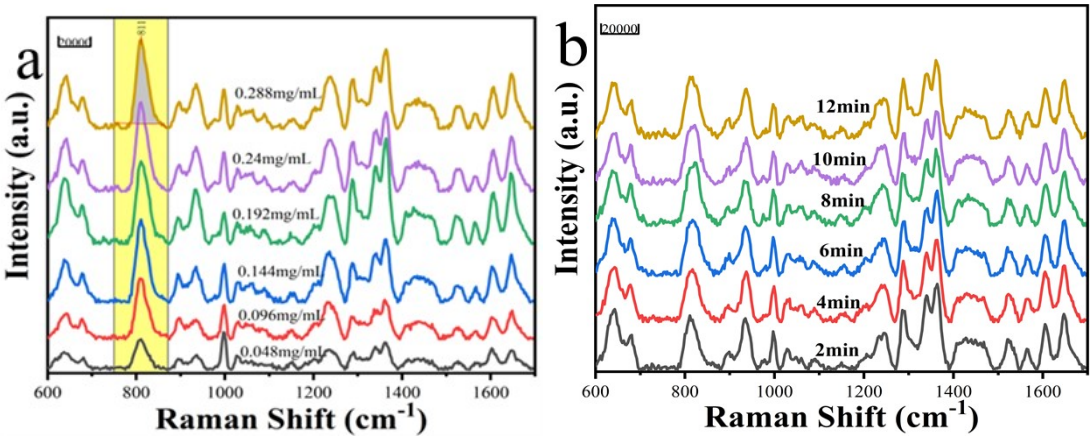

Fig S6 The (a) reaction concentration of AuNPs/Se-CDs and (b) reaction time.

Table S1 Each element contents in AuNPs/Se-CDs by XPS.

Element	Au	C	N	O	Se	S
Atomic %	17.21	52.53	4.62	22.26	1.45	1.93

Table S2 The calculation results of the actual sample detection (n=3).

Samples	Spiked (ng/mL)	Measured value (ng/mL)			Recovery (%)				
		n1	n2	n3	n1	n2	n3	Average	RSD
Cigarette oil A	0								
	0.4	0.37	0.40	0.36	92.5	100.0	90.0	94.2	5.20
	4	4.13	3.93	4.19	103.3	98.3	104.8	102.1	3.40
	40	40.51	39.97	38.94	101.3	99.9	97.4	99.5	1.99
Cigarette oil B	0								
	0.4	0.43	0.39	0.41	107.5	102.5	97.5	102.5	5.00
	4	4.02	3.91	3.88	100.5	97.8	97.0	98.4	1.84
	40	41.16	38.98	40.08	102.9	97.5	100.2	100.2	2.73