Electronic Supplementary Information (ESI)

A Green Approach to Nanoplastics Detection: SERS with Untreated Filter Paper for Polystyrene Nanoplastics

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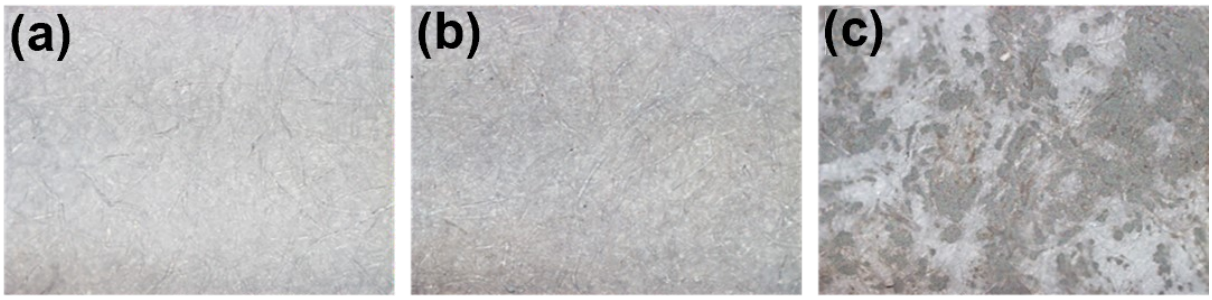

Figure S1 OM images reveal the surface of the filter paper after filtration with (a) colloidal PSNSs, (b) colloidal AgNPs, and (c) PSNSs/AgNPs with $MgCl_2$ as aggregating agents.

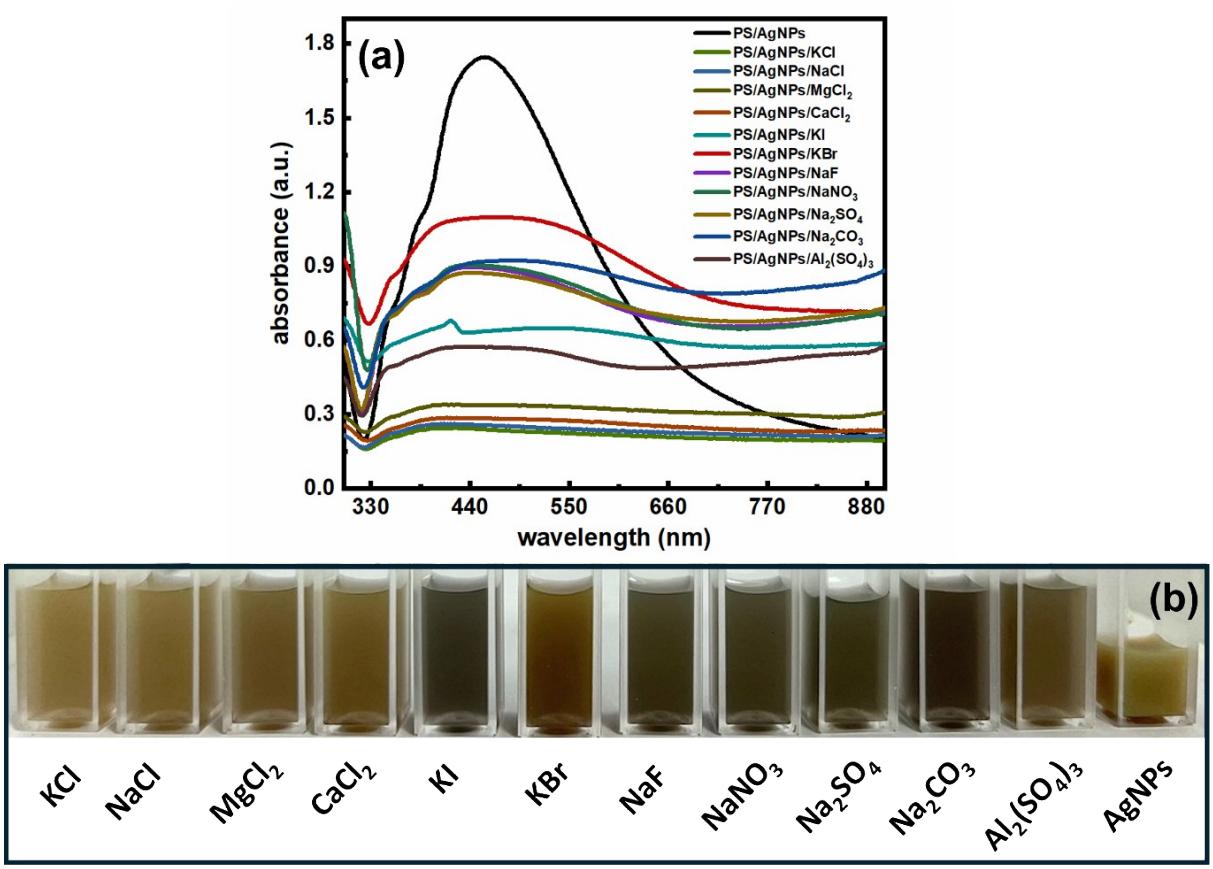

Figure S2 (a) Changes in the extinction spectra of PS/AgNPs upon particle aggregation after adding different aggregating agents. (b) Changes in the color of PSNSs and AgNPs mixture after the addition of different aggregating agents.

Table S1 LODs of various sizes of PS obtained using the proposed method.

PS nanosphere size (nm)	**LOD** (μg/mL)	**correlation coefficient (r^2)**	**equation of the line**	**linear range** (μg/mL)
100	0.3103	0.9966	y = 30.884x + 81.49	0.5–10.0
300	0.5358	0.9976	y = 33.957x + 67.26	0.5–8.0
460	0.7613	0.9952	y = 30.100x + 72.78	1.0–8.0
600	1.0473	0.9925	y = 21.863x + 98.149	2.0–10.0
800	1.4218	0.9895	y = 19.222x + 104.38	2.0–12.0

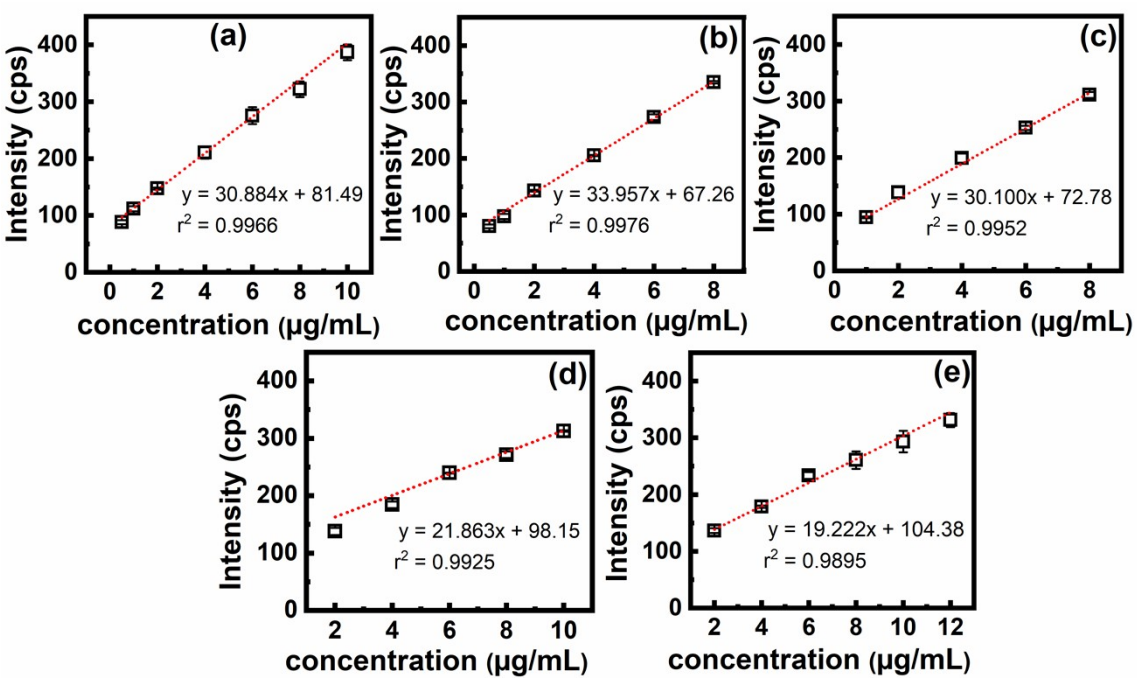

Figure S3 Plots of the SERS intensity at 1002 cm^{-1} vs the concentration of (a) 100-nm, (b) 300-nm, (c) 460-nm, (e) 600-nm, and (f) 800-nm PSNSs. Error bars indicate standard deviations of three measurements.

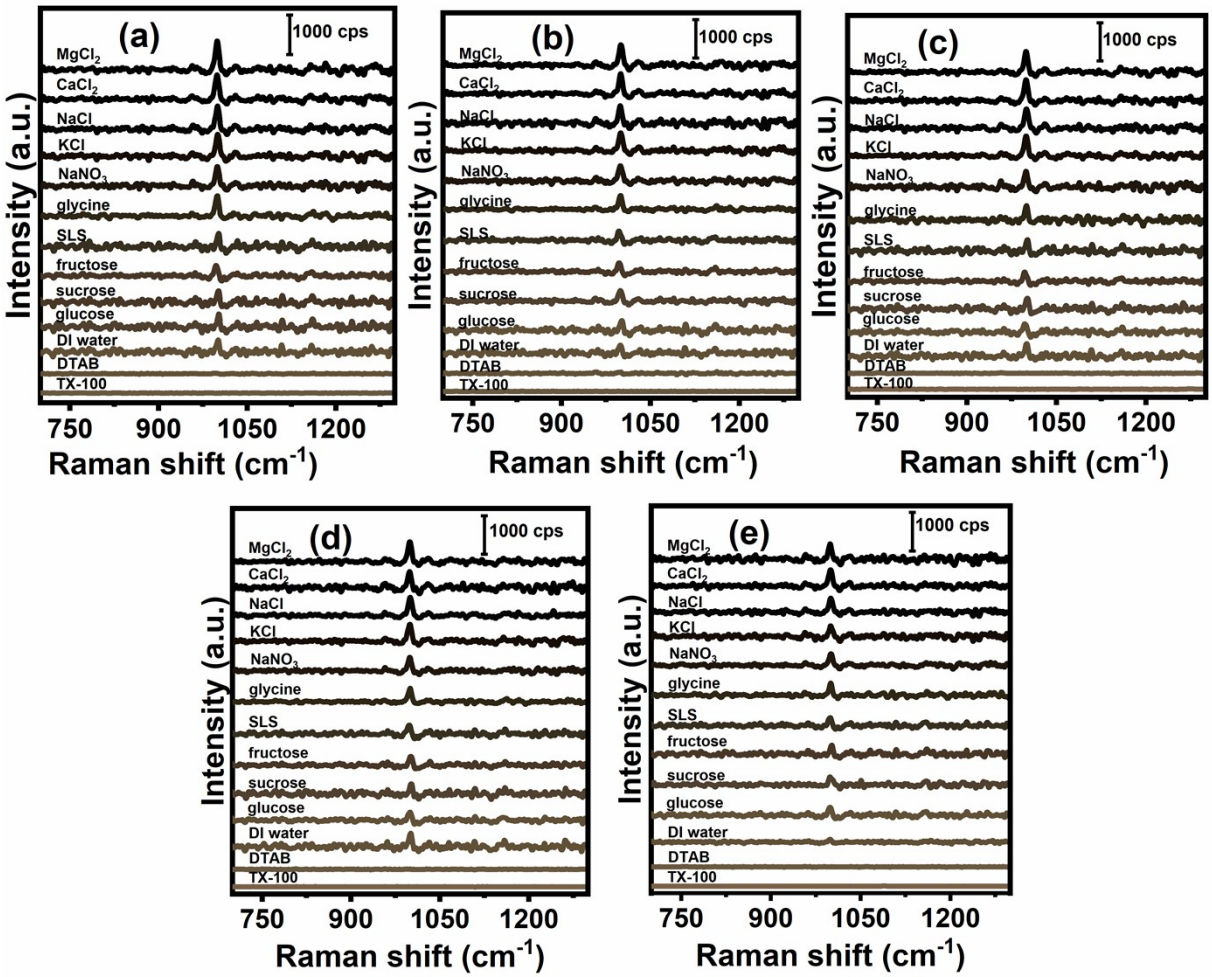

Figure S4 SERS spectra of (a) 100-nm, (b) 300-nm, (c) 460-nm, (d) 600-nm, and (e) 800-nm PSNSs (10 μg/mL) in the presence of different interferences (0.1 wt%).

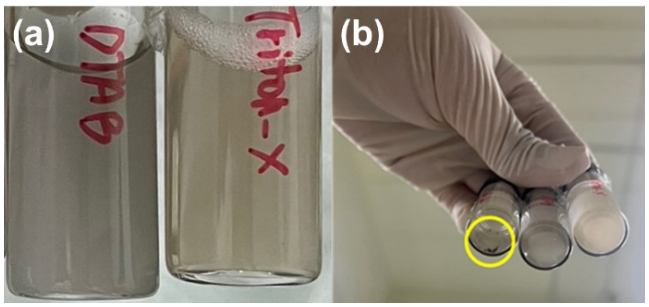

Figure S5 (a) The prepared SERS samples spiked with 0.1 wt% Triton-X and DTAB as interferences. Despite the discoloration observed after adding 1.0 mL of $MgCl_2$ solution, no particle aggregation was recorded. (b) No aggregates were filtered (as compared to the SERS sample with glycine as interference marked with a yellow circle) and thus left only a stain on the filter paper.