Electronic Supporting Information

Quantitative Analysis of Dendron-Conjugated Cisplatin-Complexed Gold Nanoparticles Using Scanning Particle Mobility Mass Spectrometry

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1. *Instrumentation*

The hyphenated instrument (Fig. S1) comprises an ES-DMA for aerosol generation and size discrimination, a gas exchange device (GED) to exchange air for argon, a condensation particle counter (CPC) to determine particle number concentration, and an ICP-MS for quantitative elemental analysis. Details of the components have been described in our previous work.[1]

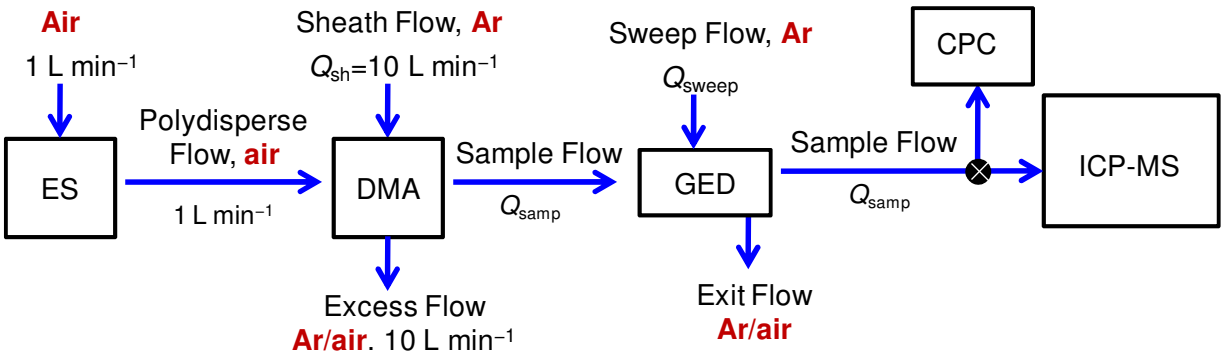

Figure S1. Schematic diagram of the ES-DMA/ICP-MS hyphenated instrument.

2. *Elemental-Based PSD for Pt^{II}-G1-SH-AuNPs and Pt^{II}-G2-COOH -AuNPs*

Figure S2 demonstrate the elemental-based PSD for Pt^{II}-G1-SH-AuNPs and Pt^{II}-G2-COOH – AuNPs. Comparing to the number-based PSD shown in the main text (Figure 2c and 2d), the elemental-based PSDs of Pt^{II}-G1-SH-AuNPs and Pt^{II}-G2-COOH-AuNPs are also similar with each (a broad size distribution peaked at 30 nm to 40 nm) and indicate more aggregation after centrifugation process.

We calculated σ_{Pt} of Pt^{II}-G1-SH-AuNPs and Pt^{II}-G2-COOH-AuNPs over the size range of $d_{p,m}$=30 nm to $d_{p,m}$ =40 nm from Figure S2 (0.2 nm step size, 50 data points in this size), where the mean and uncertainty values for σ_{Pt} were obtained from the average and one standard

deviation of ≈50 data points at different step sizes, respectively. For TA-G1-SH-AuNP, the mean value of σ_{Pt} was an average value of Peak 1 to Peak 4, and the uncertainty was reported as one standard deviation of the mean.

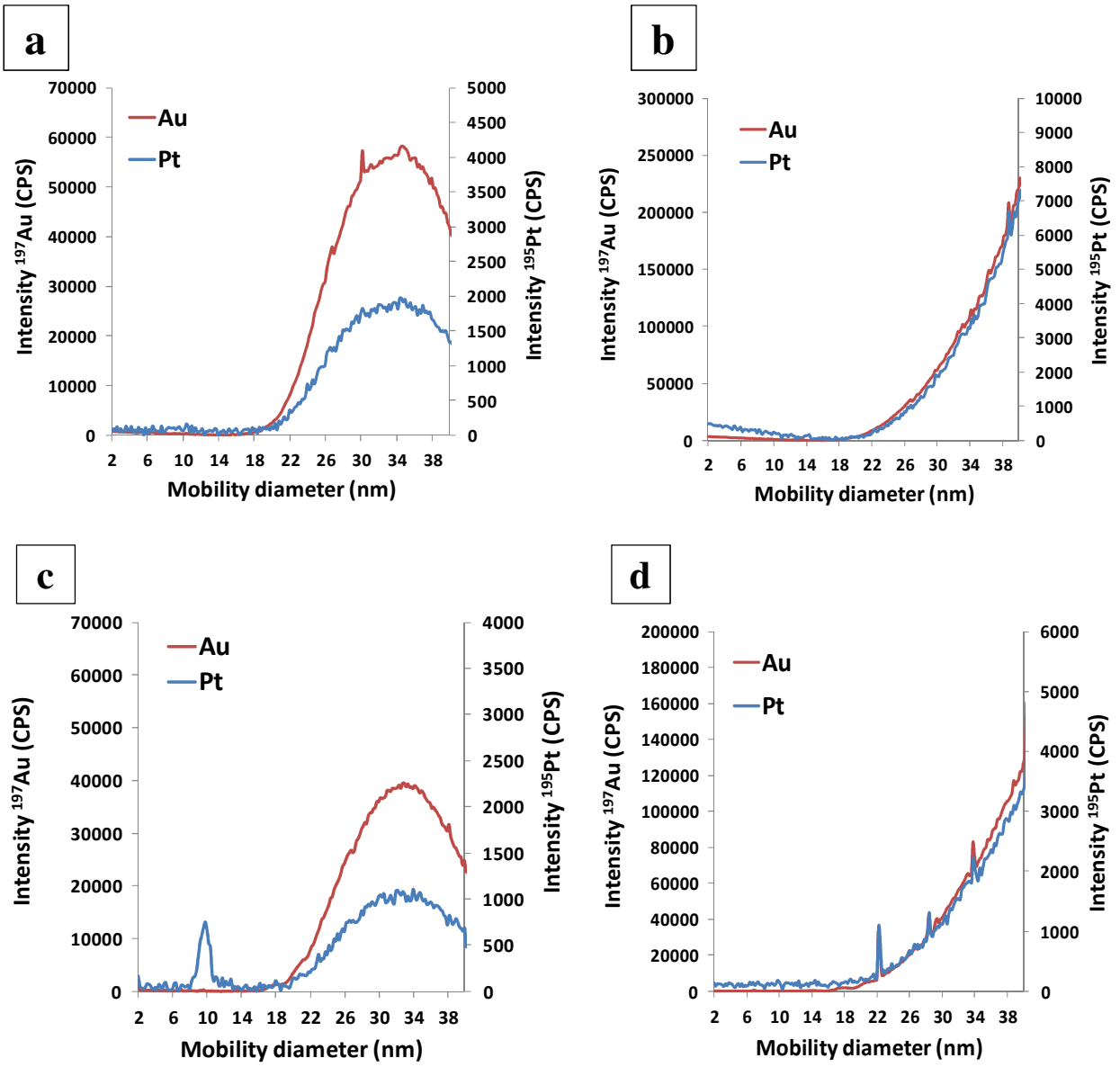

Figure S2. Elemental-based PSD for Pt^{II}-G1-SH-AuNPs and Pt^{II}-G2-COOH-AuNPs obtained in coupled mode using ES-DMA-ICP-MS. (a) Pt^{II}-G1-SH-AuNPs; dialysis cleaning only. (b) Pt^{II}-G1-SH –AuNPs; dialysis plus one cycle of centrifugation cleaning. (c) Pt^{II}-G2-COOH –AuNPs; dialysis cleaning only. (b) Pt^{II}-G2-COOH-AuNPs; dialysis plus one cycle of centrifugation cleaning. Blue: ^{195}Pt trace; Red: ^{197}Au trace.

3. Derivation of Relative Mass (M)

Table S1 shows the parameters useful for calculation of the relative mass of particle, *M*. *I* (^{197}Au) and *I*(^{195}Pt) are the measured intensity for ^{197}Au and ^{195}Pt traces (determined by ICP-MS), respectively (Figure 3c of the main text). $N_{p,g}$ is measured by CPC (Figure 2 of the main text). *M* is then obtained by dividing the $I/N_{p,g}$ for each peak by the $I/N_{p,g}$ for Peak 1, assuming Peak 1 contains only singlet AuNPs.

The mean values reported in the main text are determined as the average of *M* (by ^{195}Pt) and *M* (^{197}Au), and the uncertainty is defined as one standard deviation of the mean value.

Table S1. *M* values for Pt^{II}-TA-G1- AuNP

Peak ID	$N_{p,g}$,by CPC (#/cm^3)	*I* (by ^{195}Pt)	*I* (by ^{197}Au)	$I(^{195}Pt)/N_{p,g}$	$I(^{197}Au)/N_{p,g}$	*M* (by ^{195}Pt)	*M* (by ^{197}Au)
1	451	171	8000	0.38	17.74	1.00	1.00
2	803	614	29384	0.76	36.59	2.02	2.06
3	632	742	32828	1.17	51.94	3.10	2.93
4	321	464	19687	1.45	61.33	3.81	3.46

Reference

1. Elzey S, Tsai DH, Yu L, Winchester MW, Kelly M, and Hackley VA, "*Real-Time Size Discrimination and Elemental Analysis of Gold Nanoparticles using ES-DMA coupled to ICP-MS*", *Analytical and Bioanalytical Chemistry,* **2013**, DOI 10.1007/s00216-012-6617-z.