Supporting Information

Rapid synthesis of hierarchical, flower-like Ag microstructures with a Gemini surfactant directing agent for SERS applications

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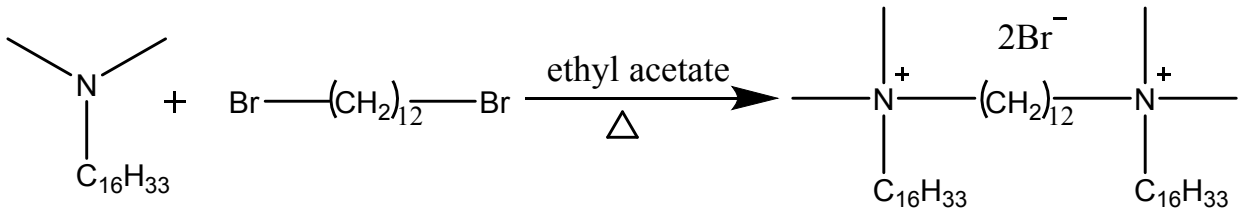

Scheme S1. Synthetic route of the Gemini surfactant 16-12-16.

Table S1. Summary of the shapes and $AgNO_3$, 16-12-16 and AA concentrations used in the synthesis of the Ag microstructures.

Group	Sample	C_{AgNO3} (M)	$C_{16\text{-}12\text{-}16}$ (M)	C_{AA} (M)	Shape
Ⅰ	1	0.1	0.01	0.1	Cauliflower
	2	0.1	0.005	0.1	Cauliflower
	3	0.1	0.0025	0.1	HFAMs
	4	0.1	0.001	0.1	Flower
	5	0.1	0.0005	0.1	Flower
Ⅱ	1	0.2	0.0025	0.1	Irregular particles
	2	0.075	0.0025	0.1	Urchin
	3	0.05	0.0025	0.1	Urchin
	4	0.025	0.0025	0.1	Mulberry
Ⅲ	1	0.1	0.0025	0.2	HFAMs
	2	0.1	0.0025	0.075	Hydrangea
	3	0.1	0.0025	0.05	Worm
	4	0.1	0.0025	0.025	Worm
	5	0.1	0.0025	0.01	Mulberry
Group	Sample	C_{AgNO3} (M)	Directing agent (0.0025 M)	C_{AA} (M)	Shape
Ⅳ	1	0.1	H_2O	0.01	Ball
	2	0.1	PVP	0.1	Ball
	3	0.1	CTAB	0.1	Mulberry
	4	0.1	16-12-16	0.1	HFAMs

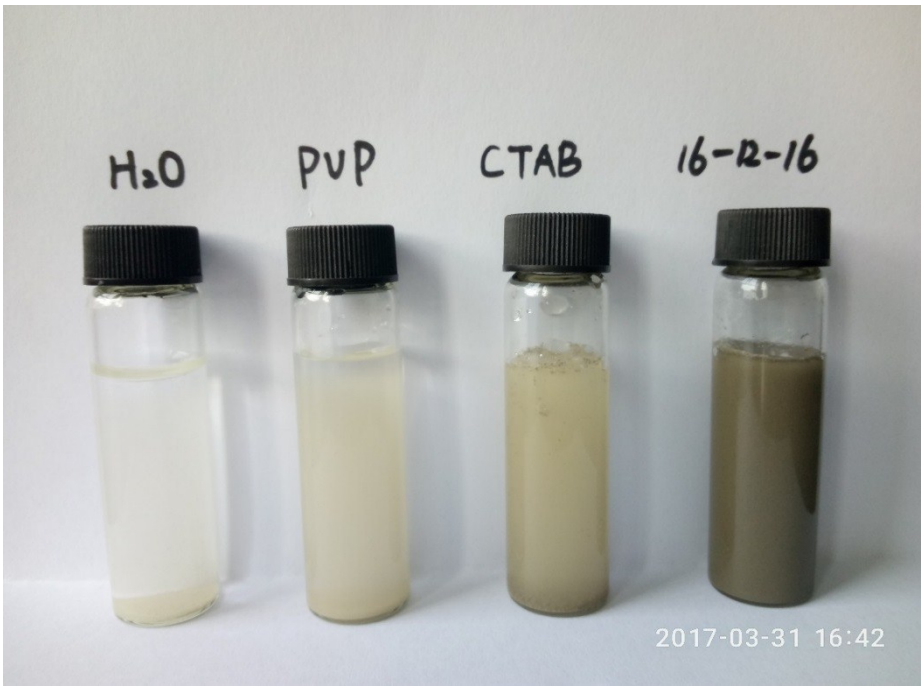

Figure S1. Photo of the products obtained from the different reaction systems.

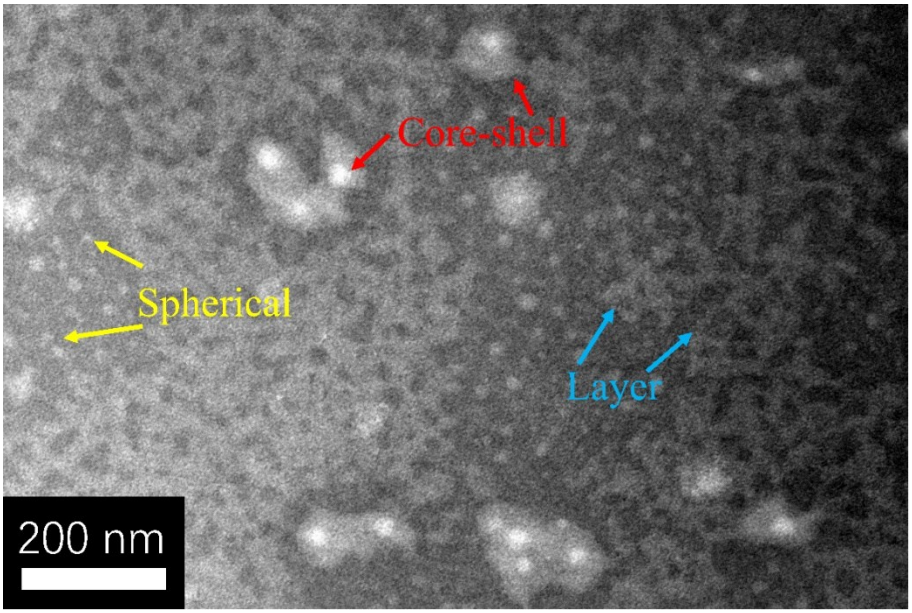

Figure S2. TEM image of the aggregates of 16-12-16 (0.0025 M).

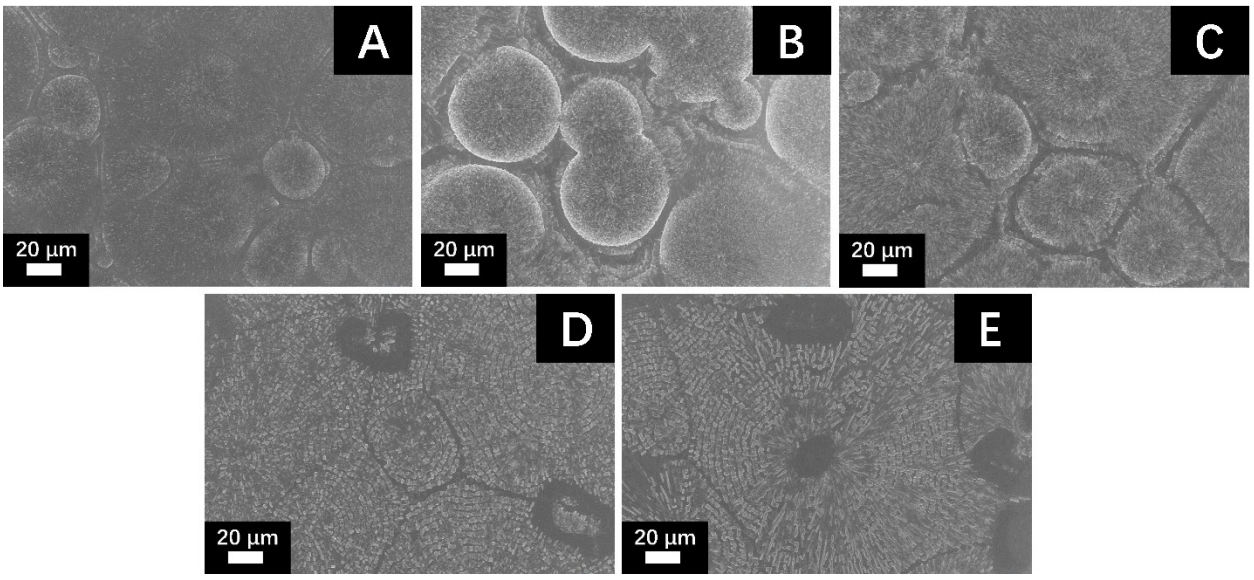

Figure S3. SEM images of the aggregates with different concentrations of 16-12-16. A) 0.01 M, B) 0.005 M, C) 0.0025 M, D) 0.001 M and E) 0.0005 M.

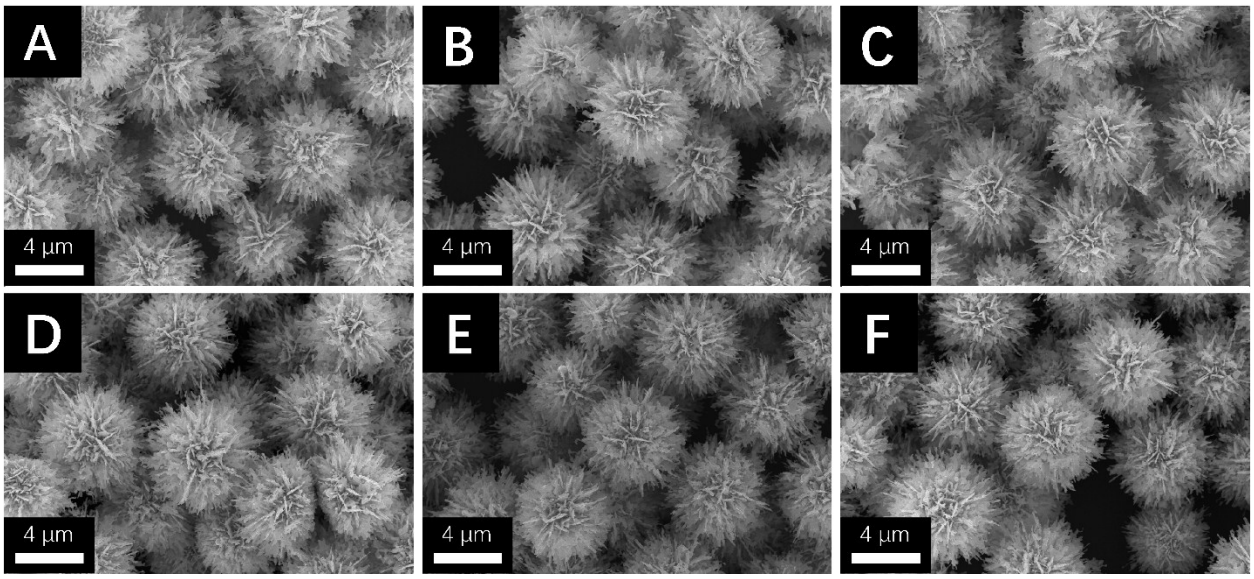

Figure S4. SEM images of the intermediate products at different reaction times. (A) 2.3 s, (B) 5.5 s, (C) 8.3 s, (D) 15 s, (E) 22.2 s and (F) 30 s. Scale bar: 4 µm.

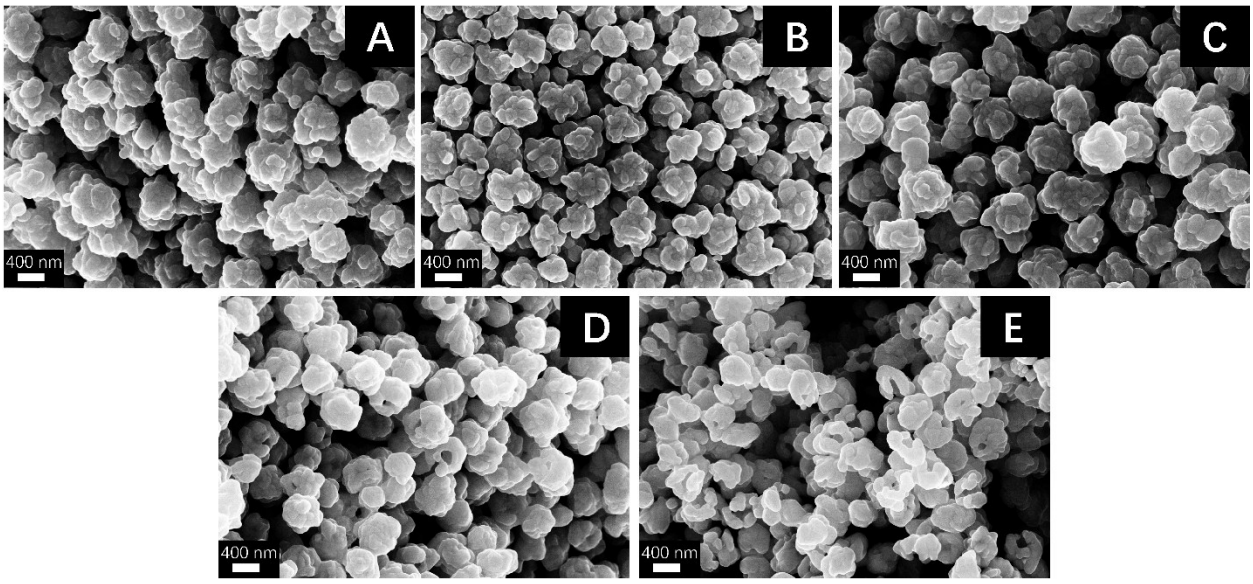

Figure S5. Typical SEM images of the products obtained using CTAB as the stabilizer with different concentrations of AA. (A) 0.1 M, (B) 0.075 M, (C) 0.05 M, (D) 0.025 M and (E) 0.01 M. Scale bar: 400 nm.

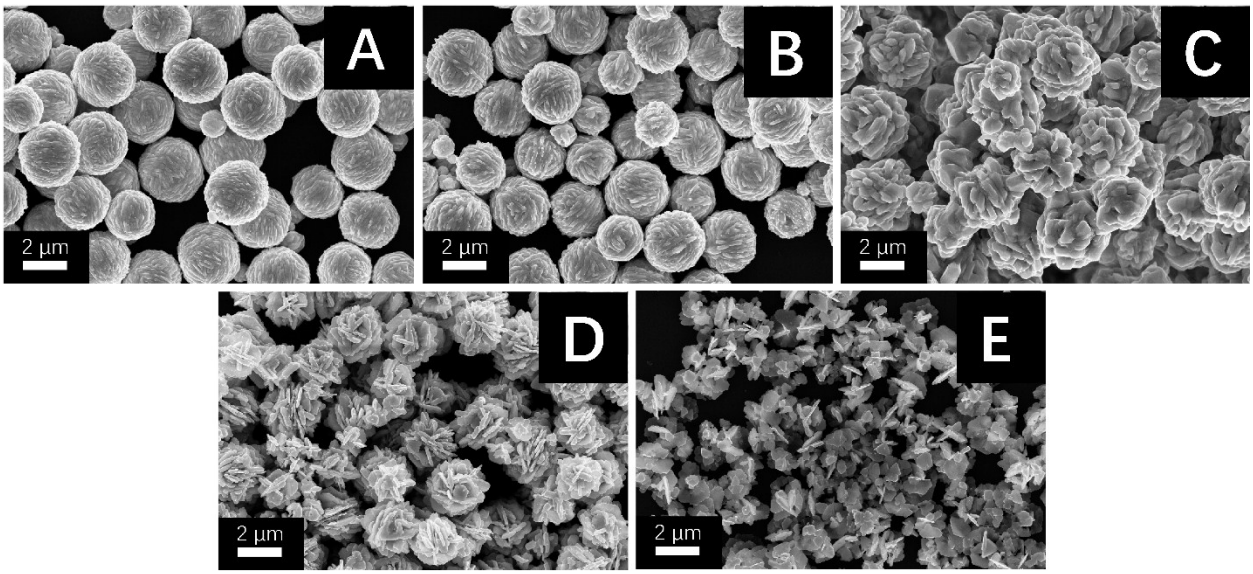

Figure S6. Typical SEM images of the products obtained using PVP as the stabilizer in different concentrations of AA. (A) 0.1 M, (B) 0.075 M, (C) 0.05 M, (D) 0.025 M and (E) 0.01 M. Scale bar: 2 µm.

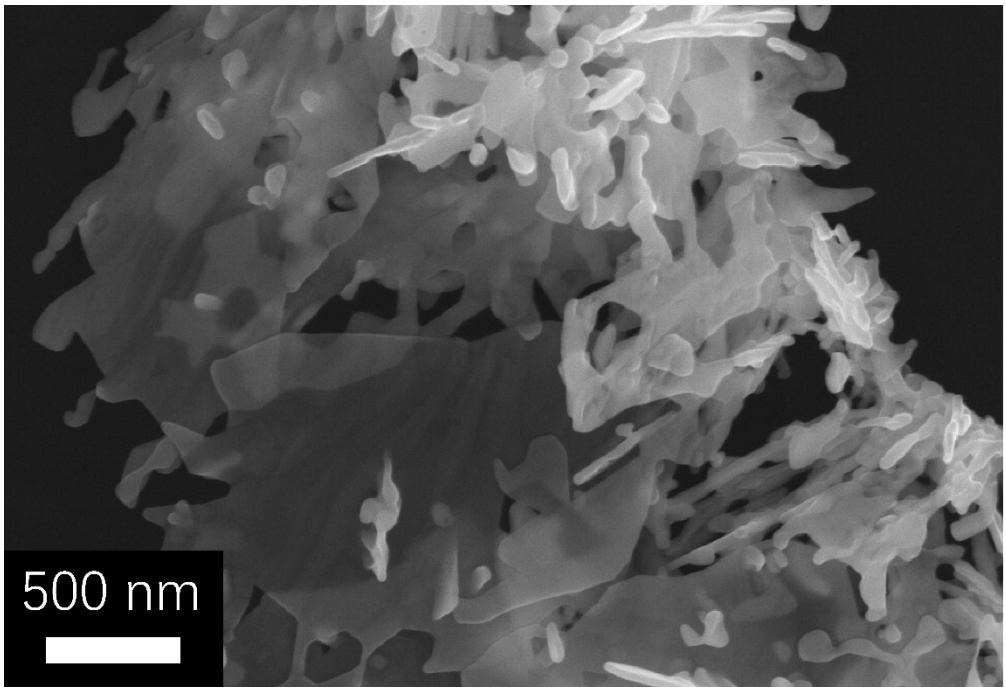

Figure S7. SEM image of the porous petals of the HFAMs.

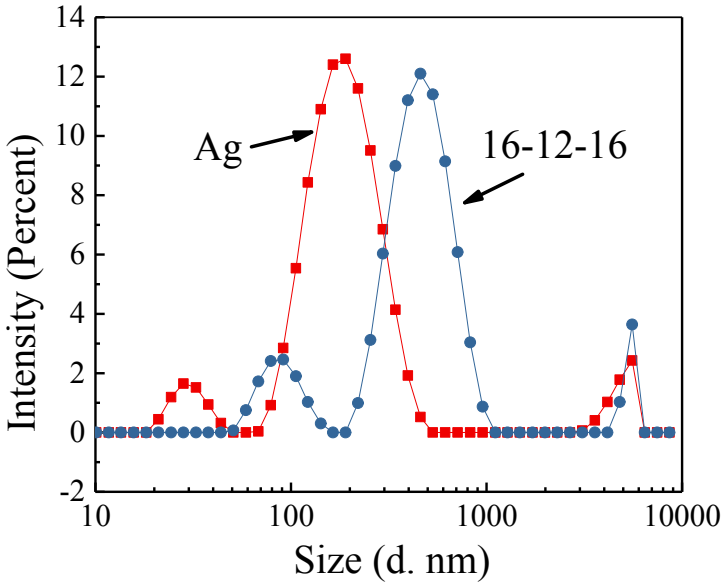

Figure S8. The particle size distribution of 16-12-16 (0.0025 M) and the HFAMs measured by DLS.