Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Morphology control of SERS-active 2D gold nanosnowflakes

Sullivan Cohen-Pope,‡ John Crockett,‡ Maggie Wang,‡ Kaitlyn Flynn, Alexandra Hoff, and Ying Bao*

Department of Chemistry, Western Washington University, Bellingham, WA 98226
‡ Contributed equally

Support Information

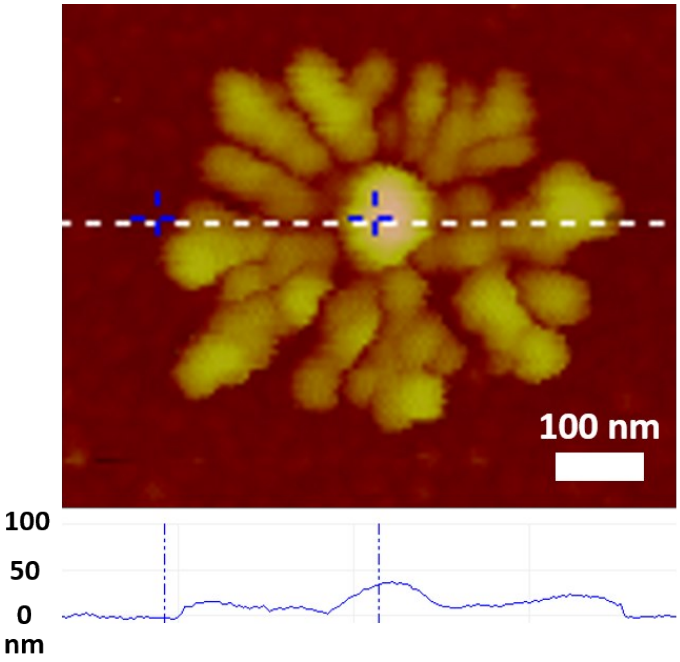


Figure S1: AFM image and line profile of Au NSF.

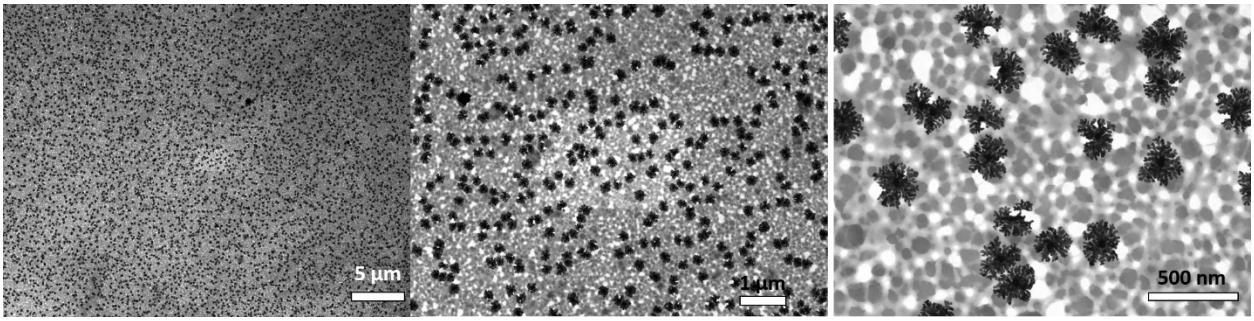


Figure S2: Low magnification (left), middle magnification (center) and high magnification (right) STEM images of freestanding Au NSFs decorated thin film.

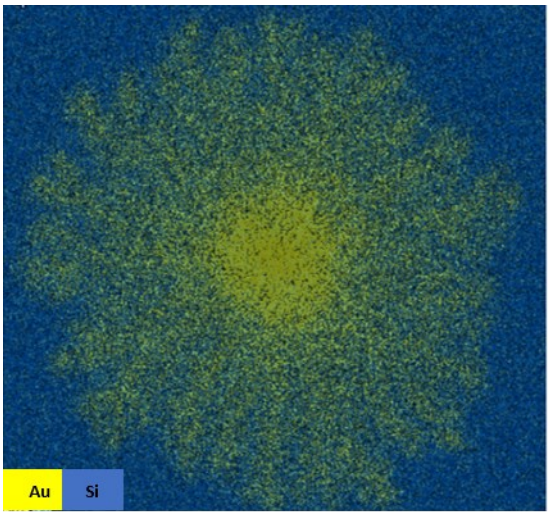


Figure S3: Elemental mapping result of the NSF prepared with diluted seed solution.

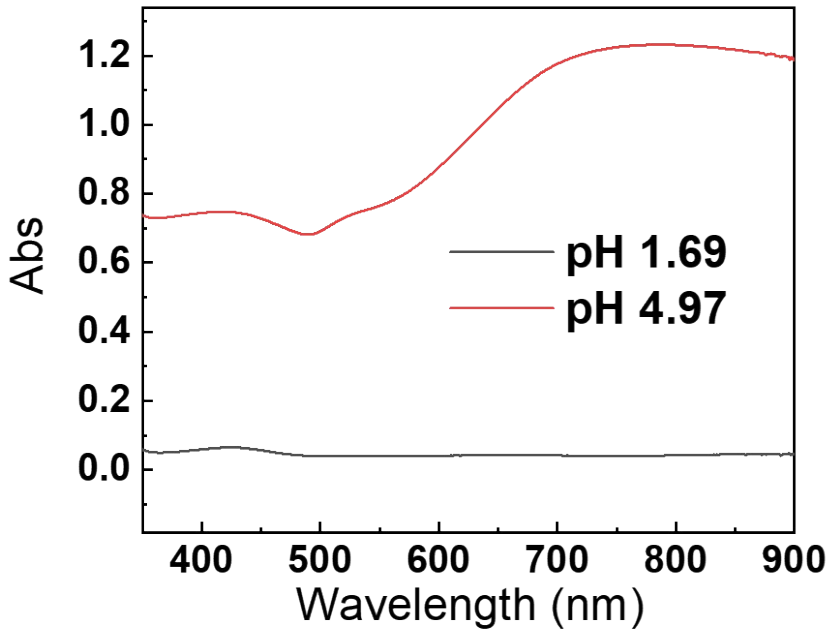


Figure S4: Optical extinction spectra of growth solution after the completion of fabricating Au NSFs under pH 1.69 and 4.97.

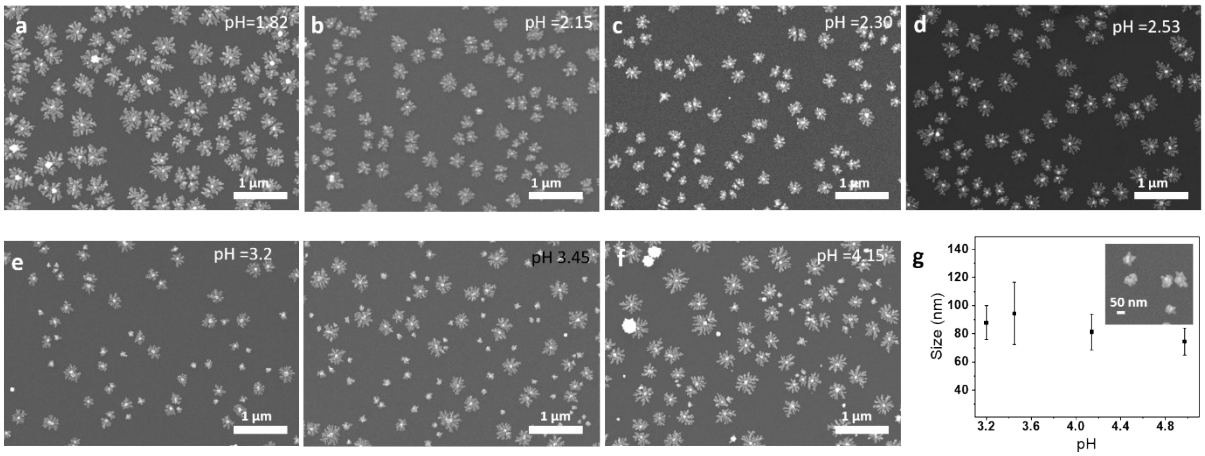


Figure S5: (a-f) SEM images of Au NSFs fabricated with pH of growth solutions at various pH values. Scale bar: 1 µm. (g) Average sizes of the popcorn-like nanomaterials fabricated at various pH growth conditions. Inset: A representative image of popcorn-like nanomaterials from pH 4.97. Scale bar: 100 nm.

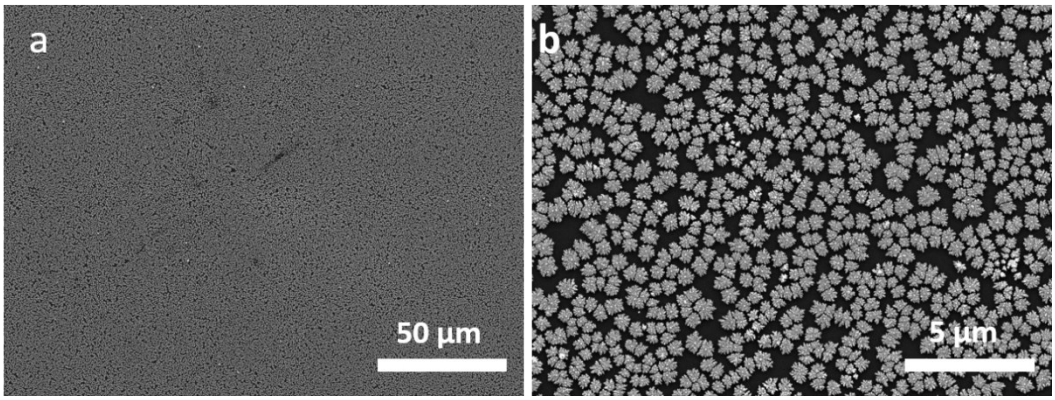
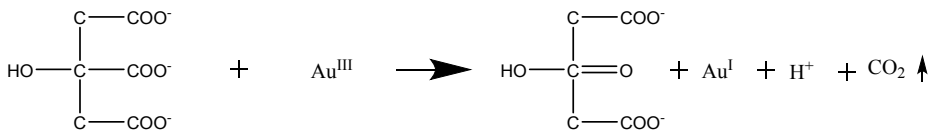


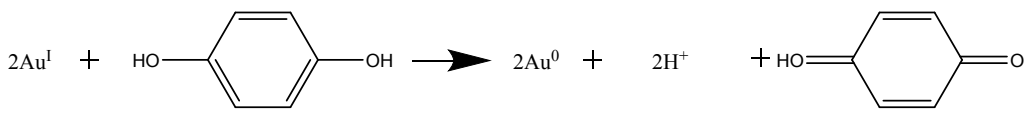
Figure S6: : Low magnification (left) and high magnification (right) SEM images of Au NSFs fabricated with pH of growth solutions at 1.69.

Scheme S1: Stepwise Reduction of Au^{3+} to Au^{1+} by Sodium Citrate (Equation 1) and Au^{1+} to Au^{0} by Hydroquinone (Equation 2)

Equation 1:



Equation 1:



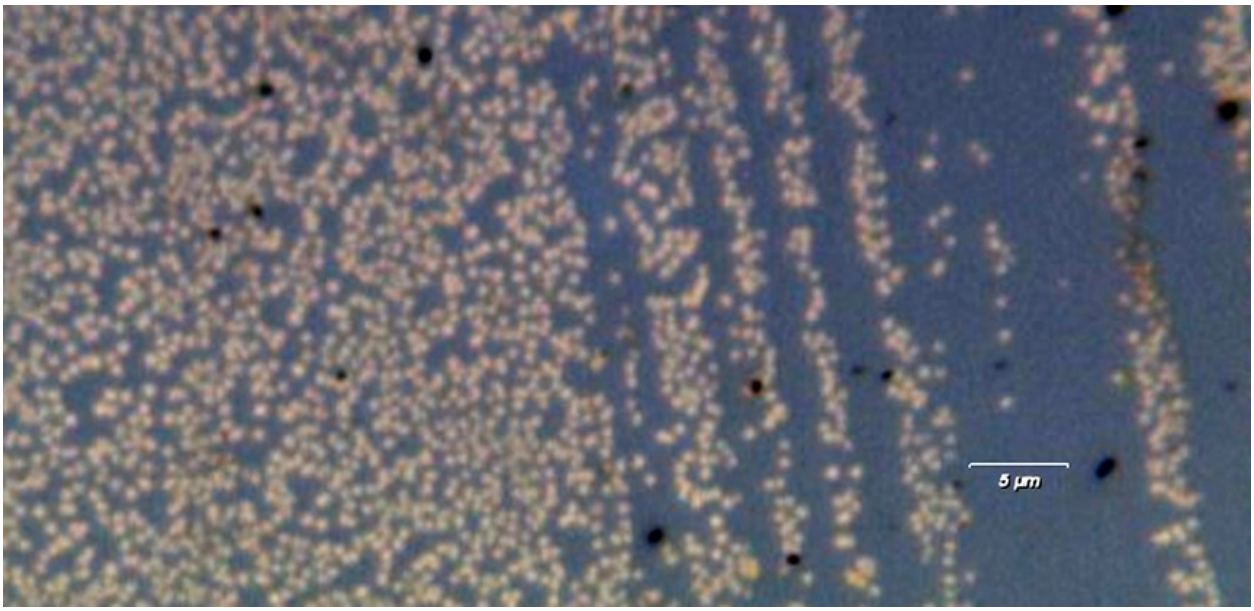


Figure S7: Optical image of Au NSFs decorated silicon substrate taken under 100× objective

Analysis FD using ImageJ

Fractal dimension was calculated with box counting algorithm via Fraclac Version 2.5 software developed by ImageJ[1, 2]. In general, a representative SEM image of individual NSF prepared at certain pH condition is divided into a number of boxes (N(r)) of a fixed size (r) in such a way that it covers almost all the fractal structure to any scale to get the overall dimension by analyzing each and every box iteratively. The graph depicts the overall boxes count required to wrap the fractal pattern as a function of 1/r (which is the inverse size of the box). A linear fit then has been plotted for the logarithmic plot (N(r)) vs inverse of the box size (1/r) to determine the value of fractal dimension (FD) from the fractal structure.

1. J. R. Ansari, N. Singh, R. Ahmad, D. Chattopadhyay and A. Datta, *Opt. Mater.*, 2019, **94**, 138-147.
2. W.-F. Cai, K.-B. Pu, Q. Ma and Y.-H. Wang, *J. Exp. Nanosci*, 2017, **12**, 319-337.