

## Supporting Information

Gold nanocone array directly grown on nickel foam for improved SERS detection of aromatic dye

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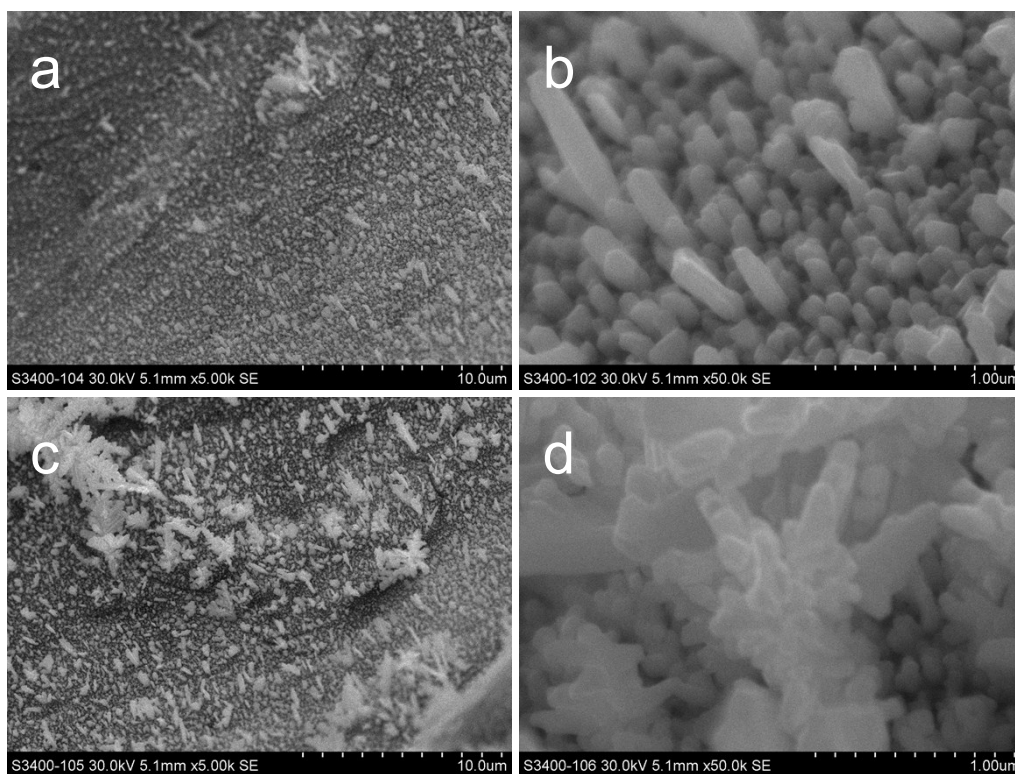


Fig. S1 SEM images of Au micro-nanostructures obtained on Ni foam in the absence of any surfactant.

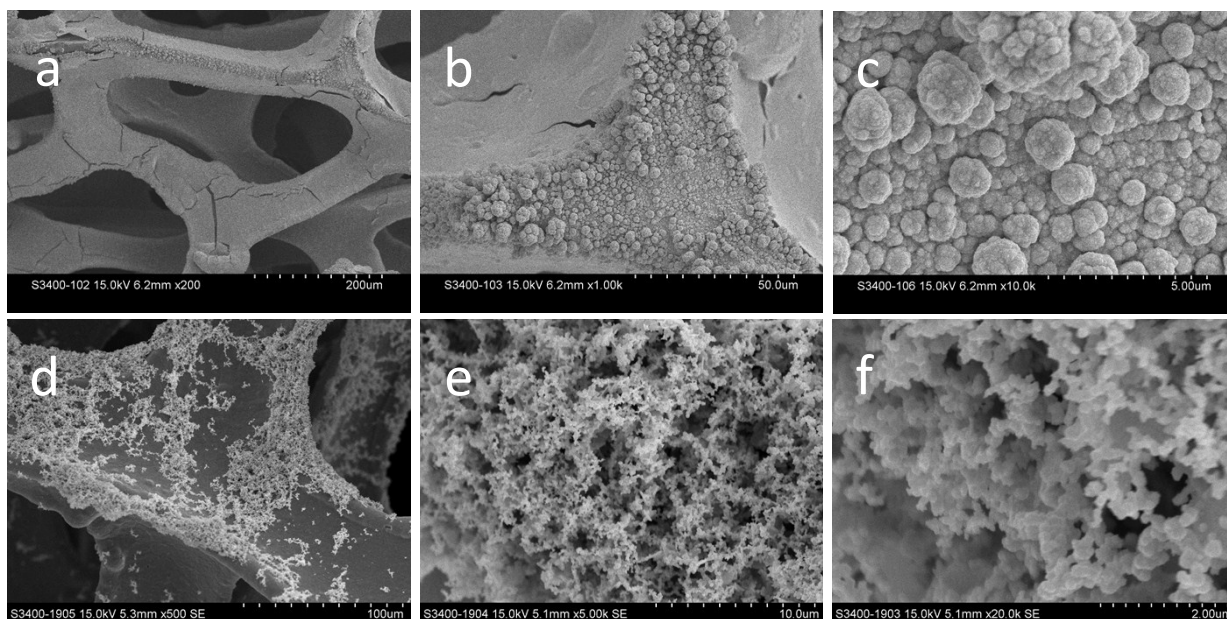


Fig. S2 SEM images of Au micro-nanostructures obtained on Ni foam in the presence of other surfactant (a-c) 20 mg/mL PVP, (d-f) 20 mg/mL sodium citrate.

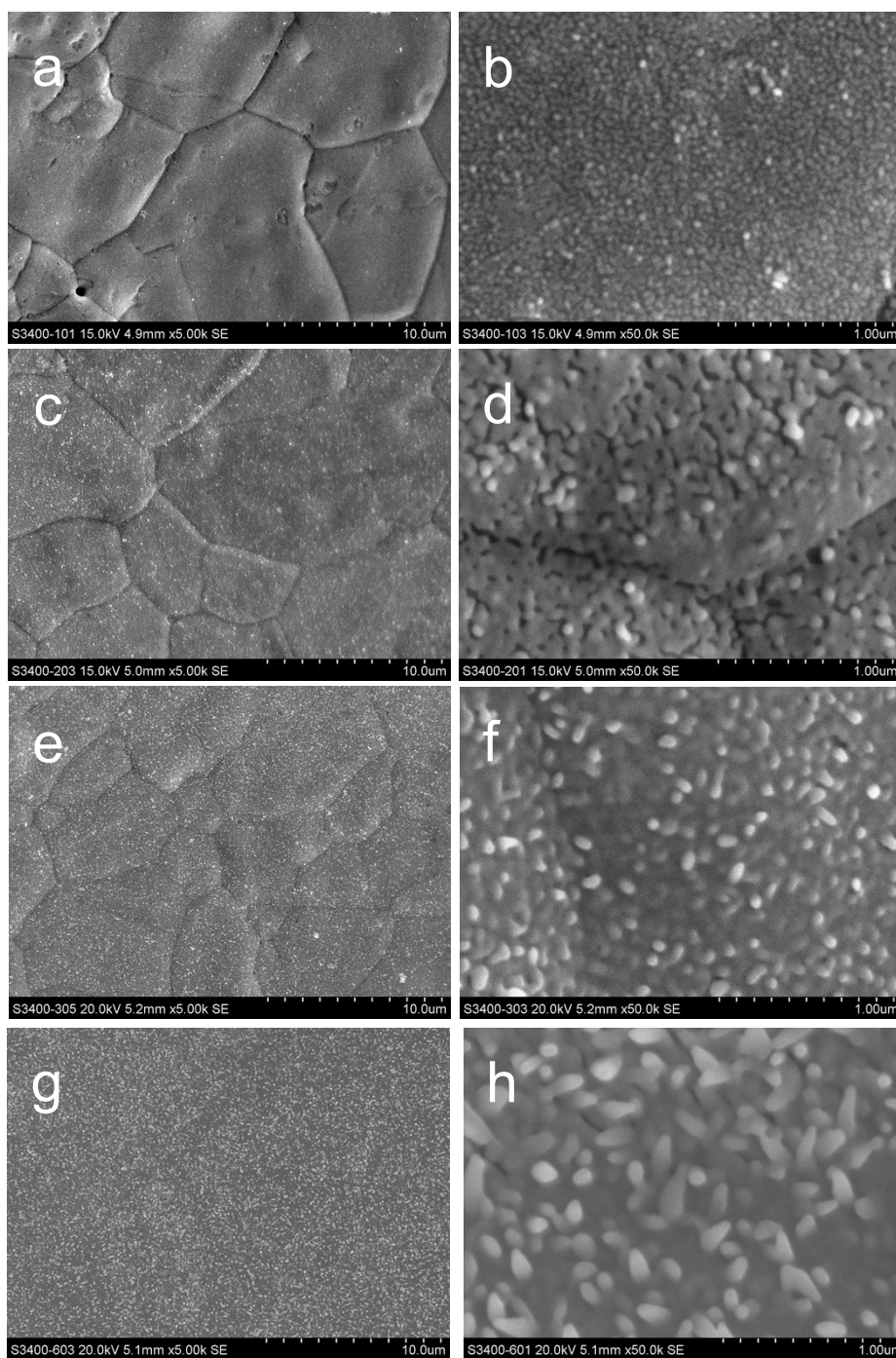


Fig. S3 SEM images of products obtained at different growth time for the reaction between H<sub>2</sub>AuCl<sub>4</sub> and Ni foam in the presence of 20 mg/mL CTAB: (a,b) 1h, (c,d) 2h, (e,f) 4h, and (g, h) 12h.

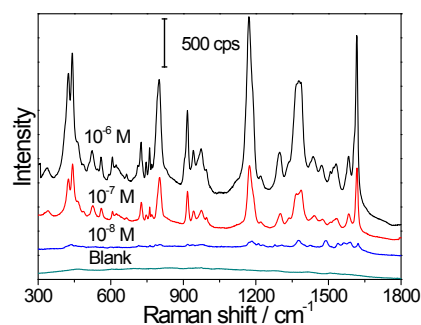


Fig. S4 SERS signal of CV at different concentration obtained on bare Au@Ni foam substrate.

Tab. S1 The assignment of SERS peaks of CV.

Raman shift of CV (cm <sup>-1</sup> )	Raman band assignment [1]
~1582 and 1616	Ring C-C stretching
~1368 and 1378	N-phenyl stretching
~1173	Ring C-H in-plane bending
~725 and 802	Ring C-H out-of -plane bending
~ 918	Ring skeletal vibrations of radical orientation
~440	C-N-C bending
~420	Out-of-plane vibrations of phenyl-C-phenyl
~335	In-plane vibrations of phenyl-C-phenyl

Tab. S2 Comparison the SERS detection performance of substrates for CV.

Substrates	LOD	Ref.
Ag-coated cellophane	10 <sup>-9</sup> M	2
Colloidal silver	3.6 x 10 <sup>-9</sup> M	3
Ag-coated filter paper	10 <sup>-10</sup> M	4
rGO-Ag	10 <sup>-7</sup> M	5
AuNCA@Ni foam	3 x 10 <sup>-11</sup> M	this work

Tab. S3 The assignment of SERS peaks of NB.

Raman shift of NB (cm <sup>-1</sup> )	Raman band assignment <sup>[6]</sup>
~1436, 1491 and 1643	Ring stretching
~1185	C-H bending
~664	In-plane CCC or NCC deformations
~ 591	C-C-C and C-N-C deformations
~496	C-C-C deformations

## Reference

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