

Supporting Information

Self-ordered Silver Nanoparticles on Nanoconcave Plasmonic Lattices for SERS Multi-Antibiotic Detection

Gohar Ijaz Dar, Elisabet Xifre-Perez*, and Lluís F. Marsal*

Departament d'Enginyeria Electrònica, Elèctrica i Automàtica, Universitat Rovira i Virgili,

Avinguda Països Catalans 26, 43007 Tarragona, Spain,

Email: eliosabet.xifre@urv.cat, lluis.marsal@urv.cat

MATERIALS

Aluminum (Al) foils with a thickness of 0.32 millimetres and a high purity of 99.9997 percent were acquired from Goodfellow from Cambridge Ltd. in the United Kingdom. The following substances were supplied by Sigma Aldrich: phosphoric acid (H_3PO_4 ; purity 97%), perchloric acid (HClO_4), chromic acid (H_2CrO_4), hydrochloric acid (HCl), Amoxicillin, ethanol ($\text{C}_2\text{H}_5\text{OH}$, EtOH) and tetracycline. The preparation of aqueous solutions was accomplished by using ultrapure water.

CHARACTERIZATION TECHNIQUES

Thermo Fisher Scientific's Scios 2 field-emission scanning electron microscope (FESEM) with a 5 kV acceleration voltage. Using a 785 nm excitation laser, 50X LWD objective lens, and 1200 lines/mm grating, SERS data were acquired using the confocal Raman micro spectrometer (Renishaw inVia Raman Microscope). A 10-second exposure was used to measure each substrate, and the laser power was 10 mW. The laser point measured 1 μm in diameter.

AG NANOFRACTALS FORMATION ON ALUMINUM CONCAVITIES

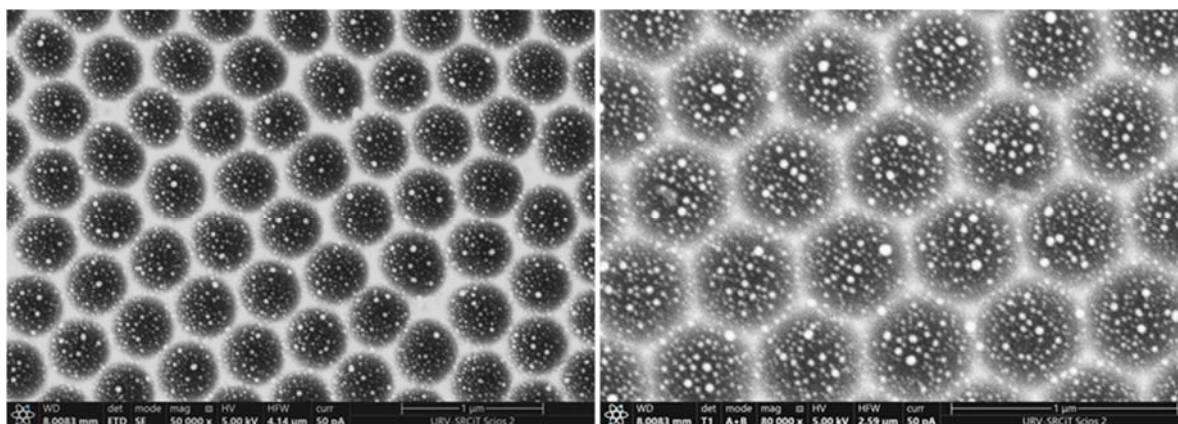


Figure S1. Aluminum nanoconcavities decorated with 100 s of silver sputtering followed by thermal annealing of 200° C for 30 min.

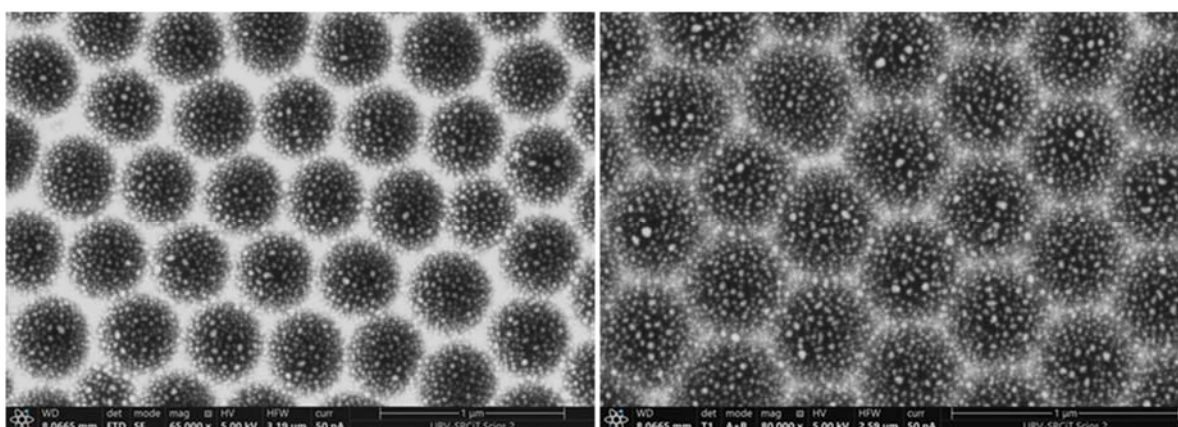


Figure S2. Aluminum nanoconcavities decorated with 150 s of silver sputtering followed by thermal annealing of 200° C for 30 min.

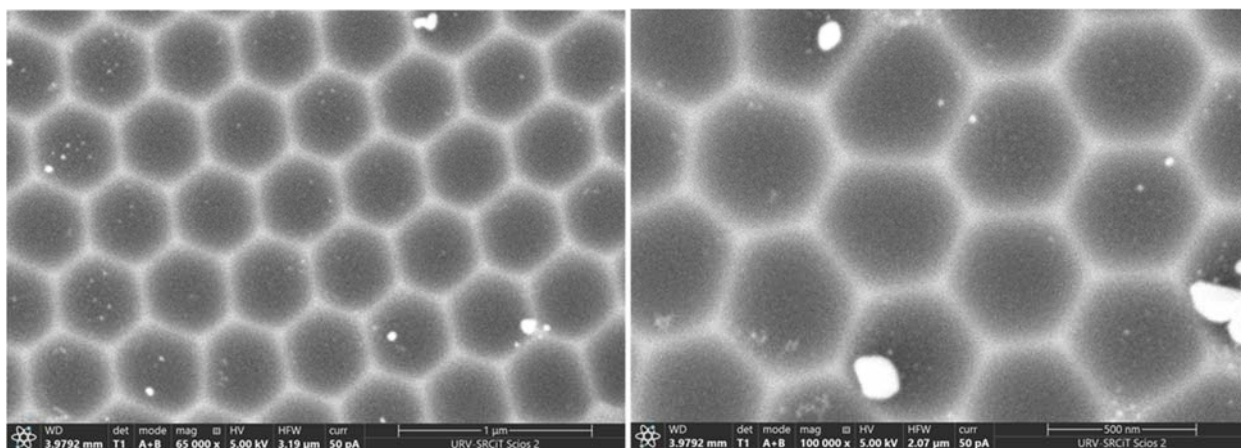


Figure S3. Aluminum nanoconcavities decorated with 100 s of silver sputtering followed by thermal annealing of 300° C for 30 min.

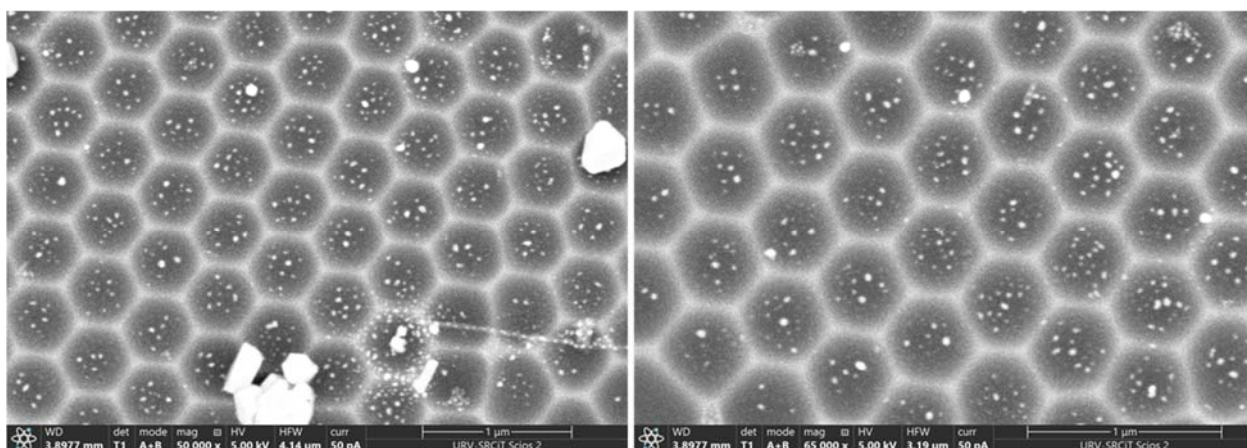


Figure S4. Aluminum nanoconcavities decorated with 150 s of silver sputtering followed by thermal annealing of 300° C for 30 min.

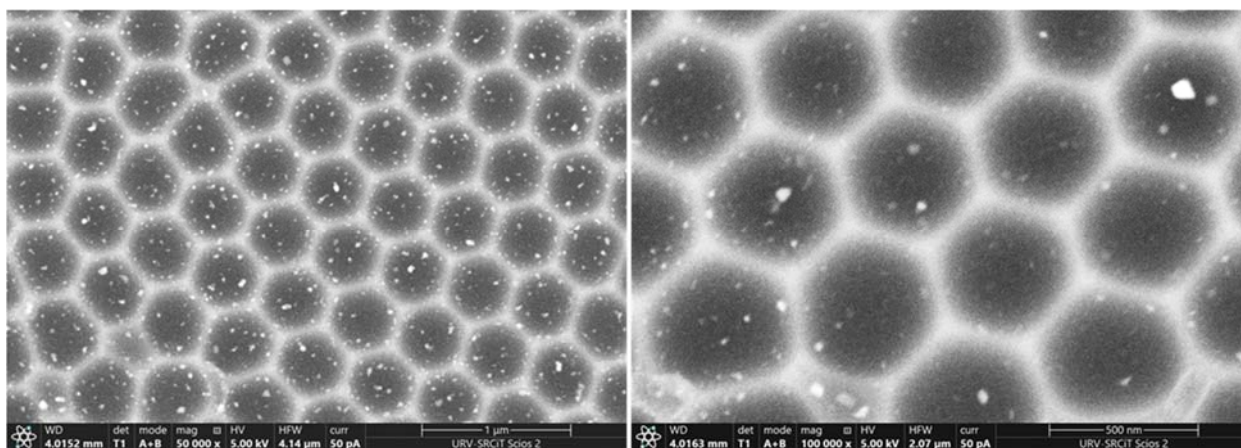


Figure S5. Aluminum nanoconcavities decorated with 200 s of silver sputtering followed by thermal annealing of 300° C for 30 min.

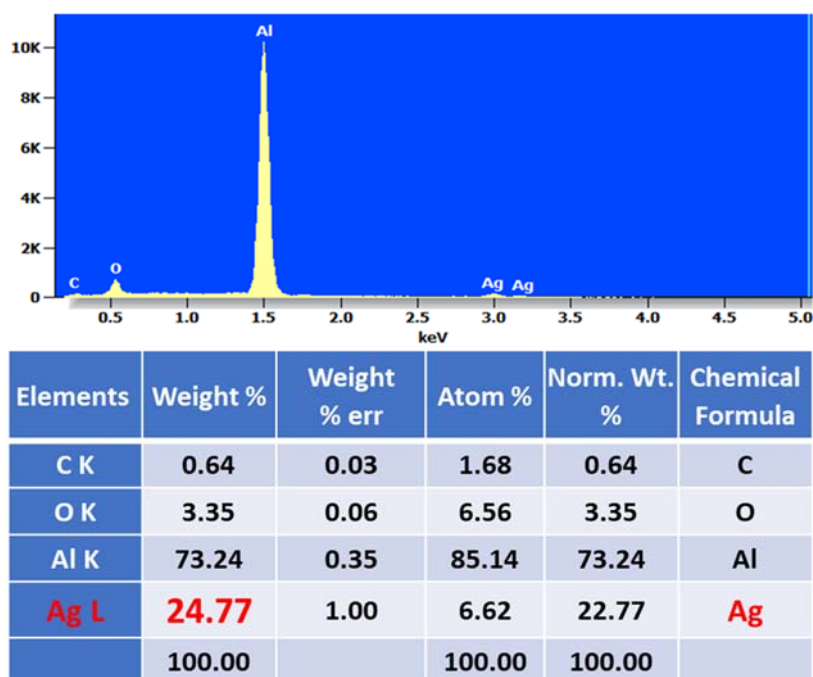


Figure S6. Quantitative EDS examination of the resulted Ag enriched nanofractals for the The Al substrate with 180 s sputtering and thermal sintering at 200° C for 30 minutes (Al-Con_Ag_{180 s})

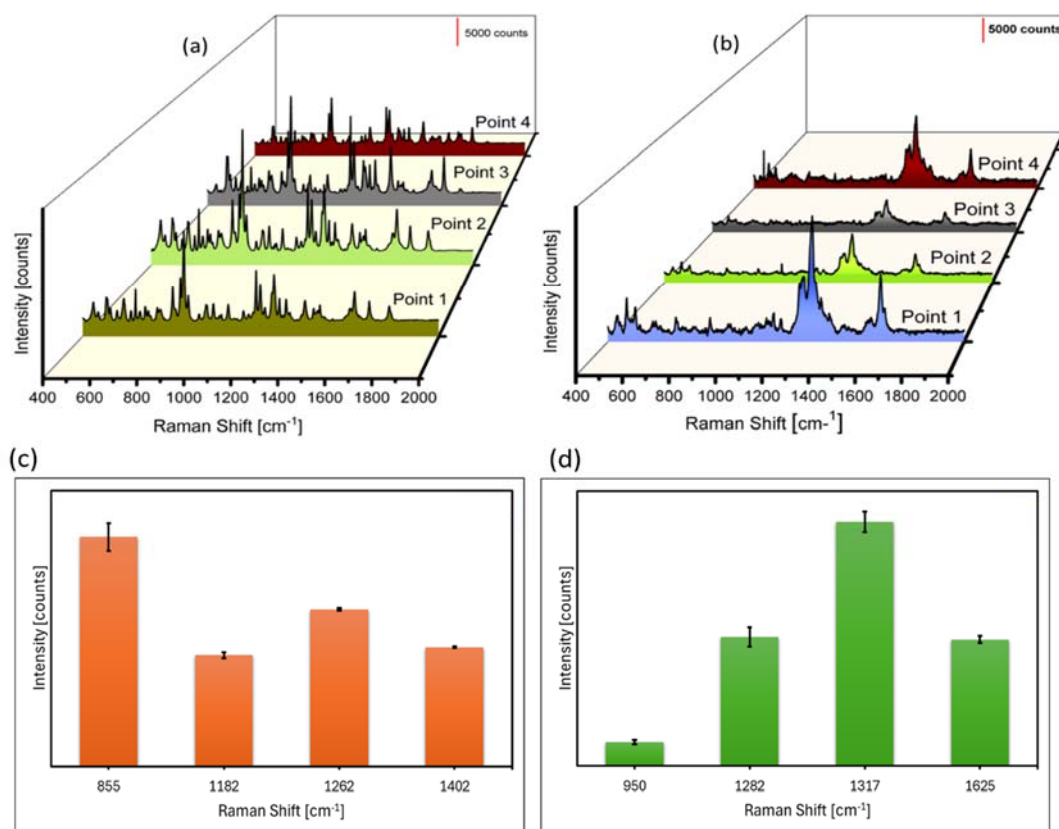


Figure S7. Raman spectra of different points of the same substrate for the detection of (a) amoxicillin (10^{-6} M) and (b) tetracycline (10^{-6} M). SERS intensity at different characteristic Raman peaks for different batches for the detection of the amoxicillin (c) and tetracycline (d).