

Supporting Information

Structure Evolution and SERS Activation of Cuprous Oxide Microcrystals via Chemical Etching

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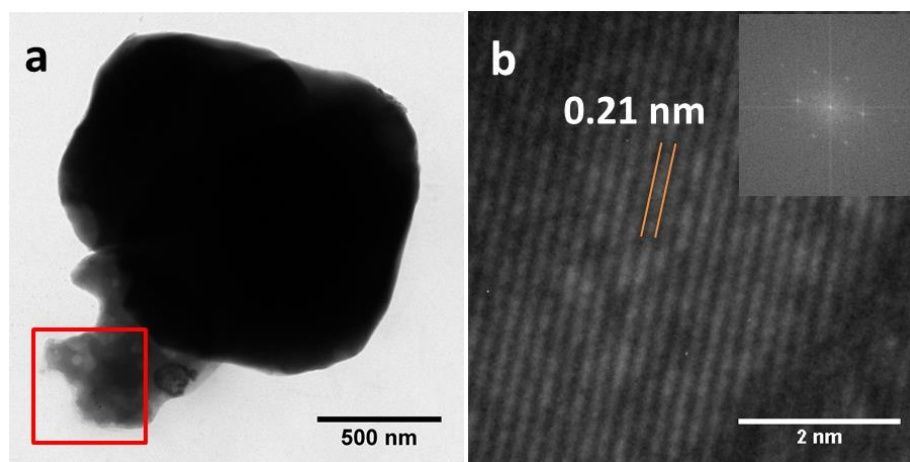


Figure S1. TEM image (a) of Cu₂O microcrystal which etched by NH₃·H₂O (pH=11.7) for 20 min. (b) HRTEM image corresponding to area in (a).

LB Film Preparation

A solvent exchange method was used to disperse Cu₂O microparticles into chloroform. Briefly, centrifugation at 3,000 rpm was utilized for 3 minutes to precipitate the Cu₂O microparticles from the storage solvent (methanol). Then the precipitation was re-dispersed into chloroform to form a uniform dispersion. Glass and silicon substrates were cleaned using piranha solution (3:1 concentrated sulfuric acid to 30% hydrogen peroxide). These substrates were rendered hydrophilic and used in transferring the Cu₂O microparticle monolayer from the air/water interface to a solid state LB thin film.

All the LB experiments are performed using a KSV 2000 system equipped with a Teflon trough that has a total subphase volume of 1172 mL with a surface area of 870 cm² (L580 x W150 x D9 mm³), a dipping well (L37 x W117 x D90 mm³), and a platinum Wilhelmy plate. In a typical experiment, 3.0 mL of Cu₂O microparticle solution is deposited drop wise onto the subphase using a 100 μL pipette. To obtain the LB films with a highly density of Cu₂O microcrystals, Teflon coated barriers were used to compress the Cu₂O microcrystal monolayer at a speed of 2 mm/min until the desired surface pressure is

reached (50 mN/m). The LB thin film is then transferred from the air/water interface to the solid substrate using a robotic dipper at 1 mm/min.

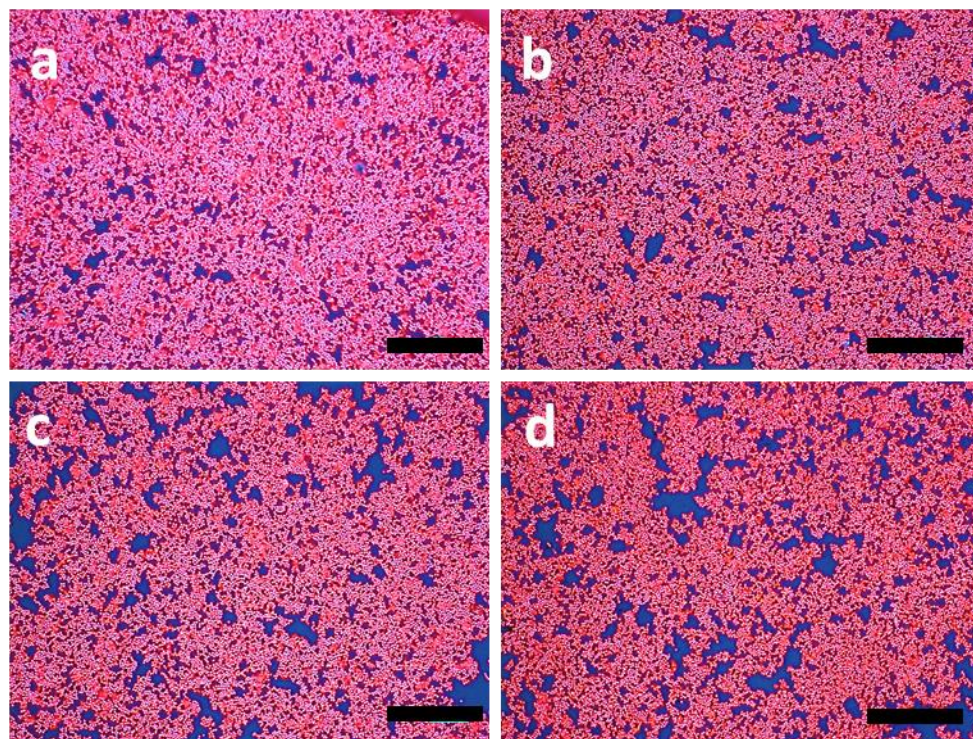


Figure S2. Digital photographic images of Cu₂O microcrystal LB films (a), (b), (c), and (d), in different etched (pH=11.7) periods: 0, 5 min, 10 min, and 15 min, respectively. Scale bar is 50 μm.

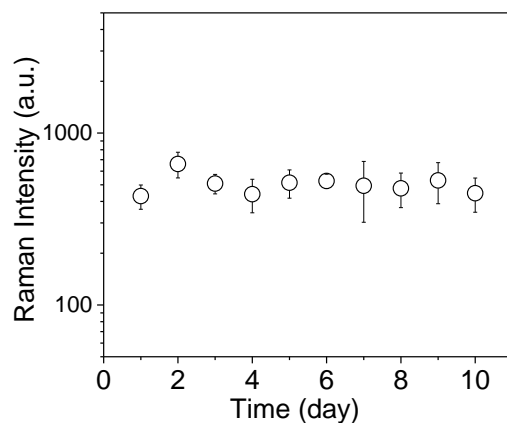


Figure S3. Stability study on Cu₂O microparticle thin films for their SERS performance. Before each Raman spectrum carried on, 4-ATP molecules solution was loaded.