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PRASERT SORNPRASIT: GOLD NANOPARTICLES ON SILVER SURFACE PREPARED BY GALVANIC REPLACEMENT REACTION. ADVISOR: ASSOC. PROF. SANONG EKGASIT, Ph.D., CO-ADVISOR: ASSOC. PROF. CHUCHAAT THAMMACHAROEN, 59 pp.

A novel technique for fabricating complex gold micro/nanostructures including coral-liked, needle-liked, Zen stone-liked gold micro/nanostructures, and coral-liked gold micro/nanoporous film using galvanic replacement reaction between a sacrificed silver metal and gold (III) ion have been reported. The complex gold micro/nanostructures could be controlled by adjustable gold ion concentration, immersion time, chloride ion concentration, pH, and ultrasonic radiation. The structural evolutions of gold micro/nanostructures were observed by scanning electron microscope (SEM) with energy dispersive X-ray spectroscope (EDS), X-ray diffraction (XRD), and digital camera. The epitaxial growth of gold film on the silver surface was disturbed by the precipitated AgCl micro/nanoparticles. The co-development of AgCl precipitates and galvanic generated Au film induced a formation of Au/AgCl micro/nanocomposites on silver surface. AgCl and $AgCl_2^-$ played important roles on the evolution of coral-liked, needled-liked gold nanostructures. The ultrasonic also induced an auto-detachment of the galvanic generated film along the Ag/AgCl interface. The complex gold nanostructures with nanoporous morphology were realized once the co-developed AgCl was removed. The coral-liked gold micro/nanoporous express high SERS detection up to 10^{-6} M rhodamine 6G (R6G) and crystal violet (CV).

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