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Control the Drying Configuration of Suspensions via Regulating the Surface Topologies for Surface-Enhanced Raman Scattering Optimization

Bingpu Zhou,^{a,*} Yibo Gao,^b Xiaoxiao Wu,^c and Weijia Wen^{b,c,†}

^a*Institute of Applied Physics and Materials Engineering, University of Macau, Taipa, Macau*

^b*Environmental Science Programs, School of Science, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong*

^c*Department of Physics, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong*

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Corresponding Author

*Email: bpzhou@umac.mo. Fax: +853-88222426. Tel: +853-88224196.

†Email: phwen@ust.hk. Fax: +852-23581652. Tel: +852-23587979.

Abstract

In this work, the authors present an innovative method to efficiently control the drying configuration of gold nanoparticles (AuNPs) for optimization of surface-enhanced Raman scattering (SERS) performance with improved sensitivity and re-reproducibility. Via repeated grafting-casting processes, we have simply regulated the surface topologies of polydimethylsiloxane (PDMS) with average surface roughness ranging from 1.4 nm to 651.3 nm. The assembling configurations of AuNPs after completed evaporation of solvent have been systematically studied on substrates with different roughness degrees. Furthermore, we found that based on the suspended droplet drying method, the inter-gaps among AuNPs can be well optimized on rougher substrate than on flat PDMS. The SERS spectra based on diverse substrates are investigated and compared, with the best available results

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