Abstract Submitted
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Porous silicon nanowire arrays decorated by Ag nanoparticles for surface enhanced Raman scattering study[1] L. SU, H.J. XU, Y.F. CHAN, X.M. SUN, Beijing University of Chemical Technology, STATE KEY LABORATORY OF CHEMICAL RESOURCE ENGINEERING TEAM — A large scale and highly ordered Ag nanoparticle-decorated porous silicon nanowire array was fabricated for a uniform and reproducible surface-enhanced Raman scattering (SERS) substrate. The overall process for the proposed structure is simple and reliable with the use of only chemical etching and metal reduction processes. The SERS sensitivity of the novel substrate as low as 10^{-16} M for rhodamine 6G (R6G) and the Raman enhancement factor as high as 10^{14} were obtained. The excellent SERS performances were mainly attributed to the strong local electromagnetic effect which is associated with the formation of large-quantity Ag nanoparticles on porous silicon nanowire array and the existence of semiconductor silicon nanowires. Significantly, the quadratic relation between the logarithmic concentrations and the logarithmic integrated Raman peak intensities provided quantitative detection of R6G. Our results open new possibilities for applying SERS to trace detection of low-concentration biomolecules.

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