

Graphene oxide/gold nanorod plasmonic paper - a simple and cost-effective SERS substrate for anticancer drug analysis

Kanyawan Ponlamuangdee^{a,b}, Gabor L. Hornyak^b, Tanujjal Bora^b, Suwussa Bamrungsap^{a,*}

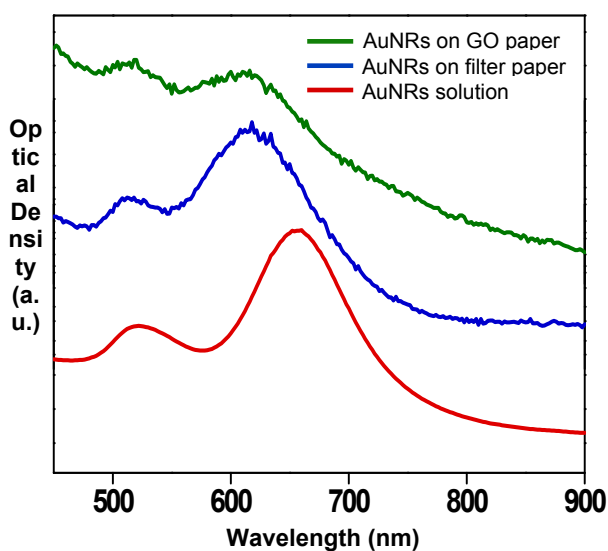
^a National Nanotechnology Center (NANOTEC), National Science and Technology Development Agency (NSTDA), Pathumthani 12120, Thailand

^b Center of Excellence in Nanotechnology, Department of Industrial Systems Engineering, School of Engineering and Technology, Asian Institute of Technology (AIT), Pathumthani 12120, Thailand

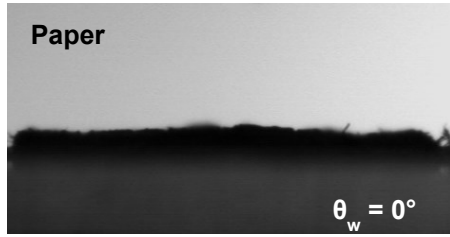
Table S1. Transverse and longitudinal SPR absorption bands of AuNRs in different circumstances.

AuNRs substrate	Transverse band (nm)	Longitudinal band (nm)
AuNRs solution	522	660
AuNRs on filter paper	518	628
AuNRs on GO paper	516	624

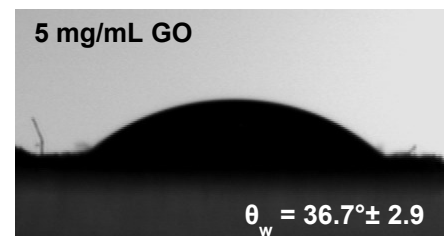
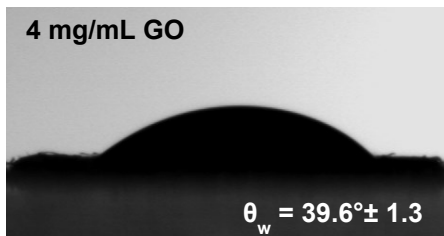
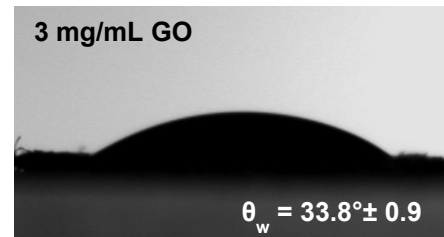
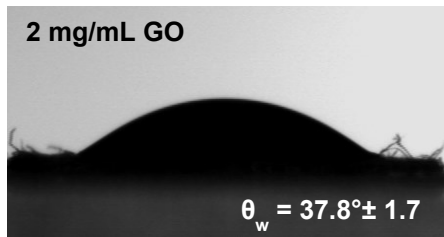
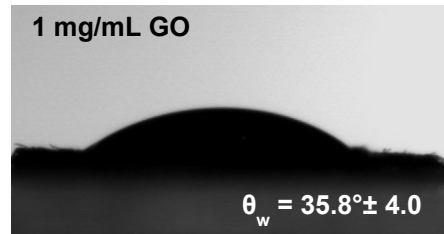
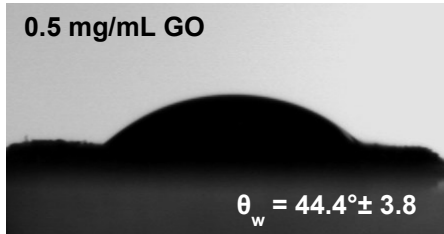
Fig. S1. Plasmon absorption spectra of AuNRs on different substrates



a



b



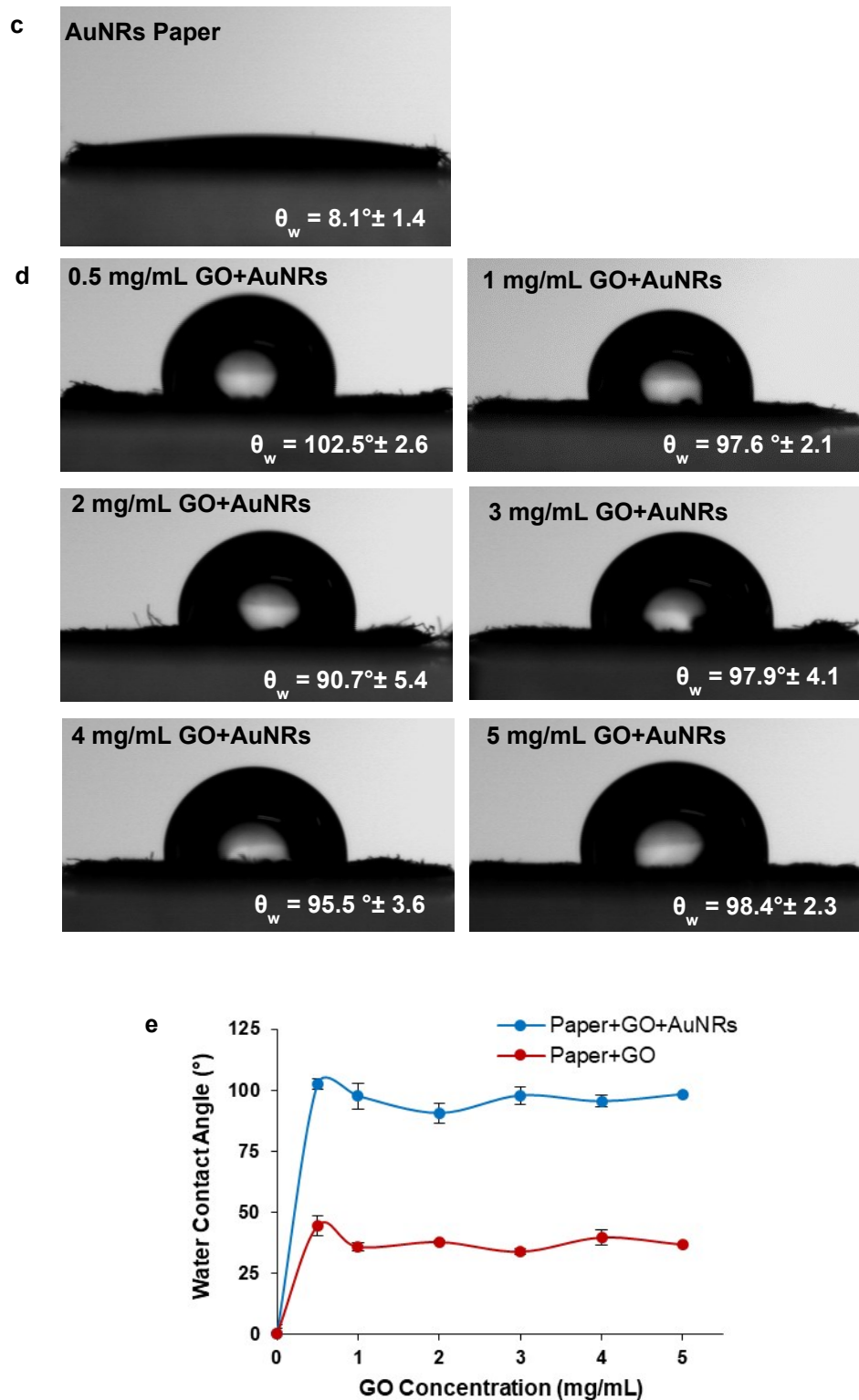


Fig. S2. Water contact angle (WCA) measured on (a) filter paper (b) GO coated filter paper prepared with various GO concentration (c) AuNRs coated filter paper (d) GO-AuNRs coated filter paper prepared with various GO concentration. (e) Graph corresponding to the independence of WCA on the paper substrates for different GO concentration. Zero mg/mL of GO concentration is the WCA measured on filter paper.

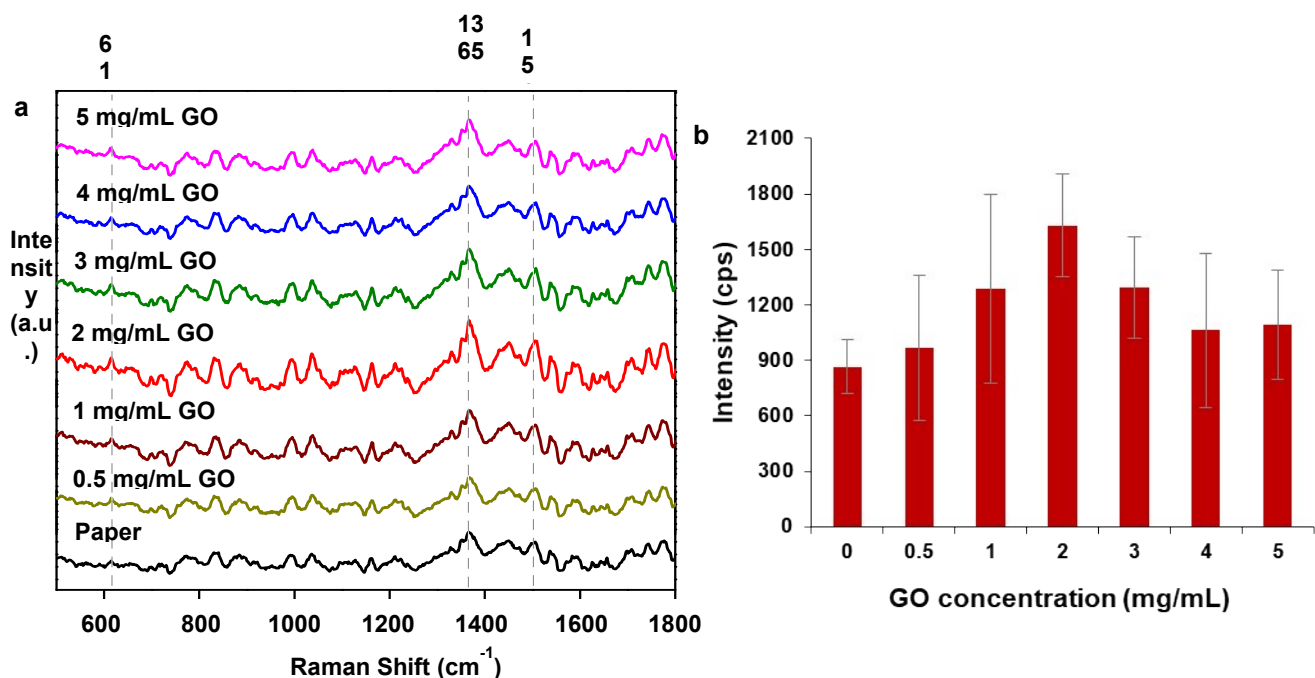


Fig. S3. (a) SERS spectra of 10 mM R6G obtained from GO coated filter paper at different GO concentration. (b) The SERS intensity of R6G at 1365 cm⁻¹ collected from these papers substrates.

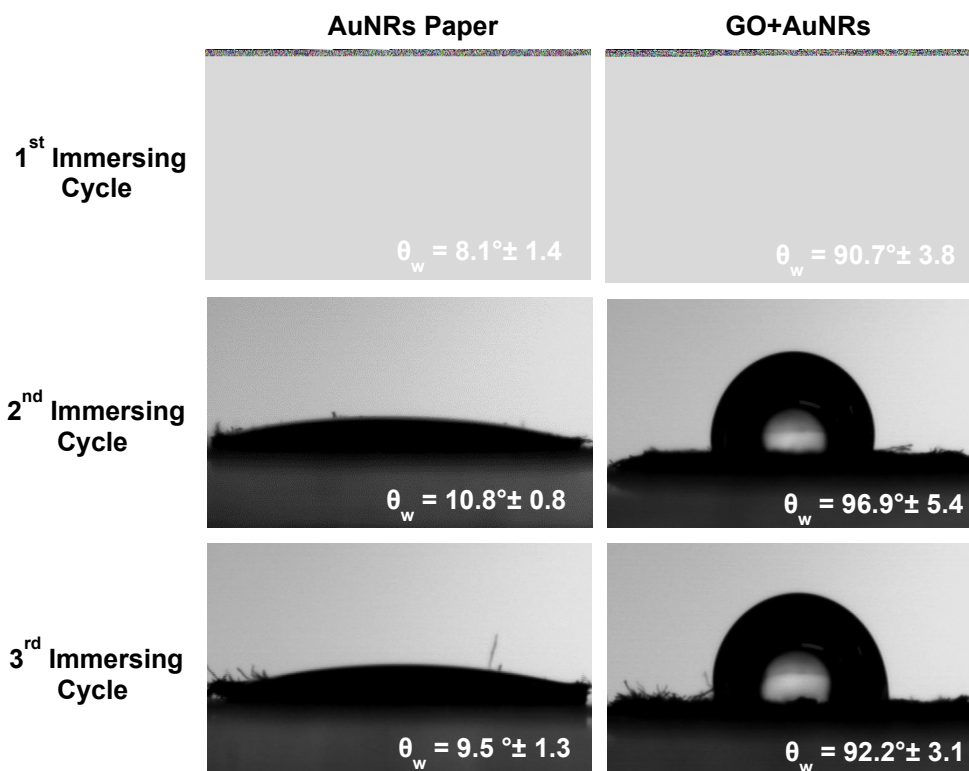


Fig. S4. WCA measured on plasmonic paper fabricated by filter paper coated with different immersing cycles of AuNRs and the plasmonic paper fabricated by filter paper coated with 2 mg/mL GO with different immersing cycles of AuNRs.

Table S2. Calculation of enhancement factor of plasmonic paper considering Raman shift of R6G molecule at 1365 cm^{-1} .

C_{sers} (M)	I_{sers}	C_{Raman} (M)	I_{Raman}	$I_{\text{SERS}}/I_{\text{Raman}}$	$C_{\text{Raman}}/C_{\text{SERS}}$	EF
1.00×10^{-10}	82	1.00×10^{-3}	18	4.56	1.00×10^7	4.56×10^7

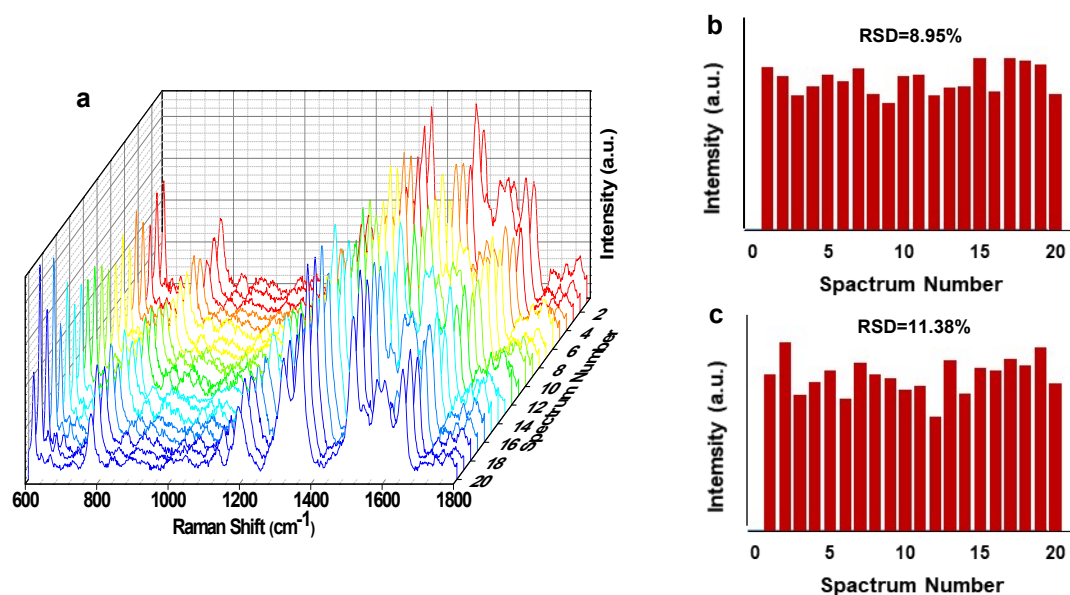


Fig. S5. (a) SERS spectra of 10 mM R6G collected from 20 random spots on GO-AuNR plasmonic paper. The SERS intensity and RSD of specific Raman peak at (b) 1365 cm^{-1} and (c) 1510 cm^{-1} obtained from the same plasmonic paper.