Supplementary Information.

Characterization of SERS Platforms Designed by Electrophoretic Deposition on CVD Graphene and ITO/glass.

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S1. Transient current. Chronoamperometry (current vs. time) for achieving EPD of Au NPs onto ITO/glass and graphene transferred to ITO/glass during 600 s which is the optimal coverage for SERS.

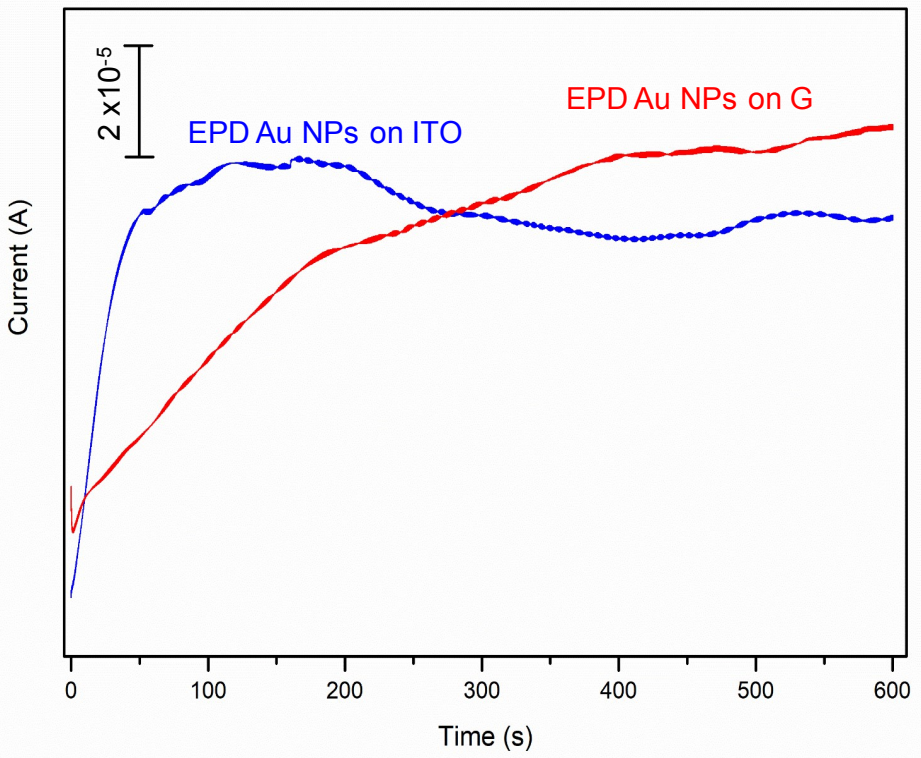

Figure S1. Chronoamperometry (CA) showing the current evolved during 600 s EPD of as-synthesized Au NPs on ITO/glass and CVD graphene transferred to ITO/glass electrode. The charge reached by both platforms was ~ 0.12 C

S2. Counting Au NPs on graphene. Figure S2 and histogram exhibit a selected area called "low agglomerated area" on graphene formed by 600 s EPD. We choose this area in order to count how many NPs are per μm^2 and compare with Au NPs deposited on ITO/glass under the same conditions. It should be mentioned that due to SEM resolution the 14 to 16 nm diam. Au NPs corresponded to the sum of 2 to 3 Au NPs (5 nm diam.) counted as one large NP.

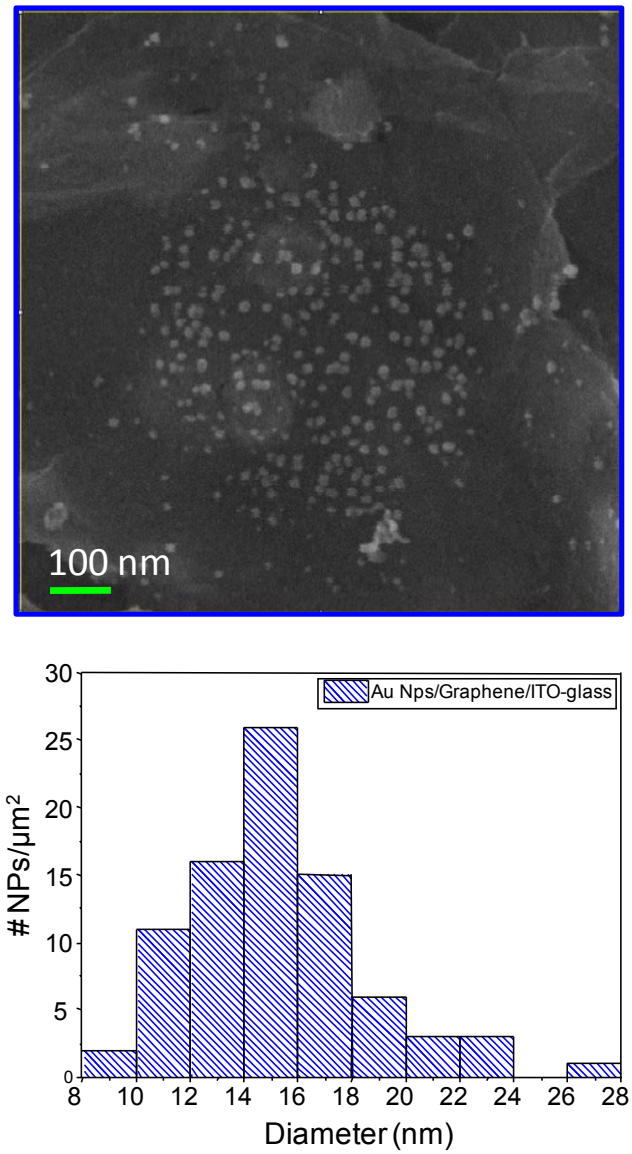

Figure S2. SEM image and its corresponding histogram which exhibit the # of Au NPs/μm^2 counted in a selected "low agglomerated area" on graphene.

S3. Immersion of both platforms in MB solution. Fig. S3 and Table S1 show the time required for achieving similar SERS at both platforms. It shows that as-deposited Au NPs on ITO required 66 h for achieving a similar signal enhancement obtained by 10 min immersion of graphene-containing platform.

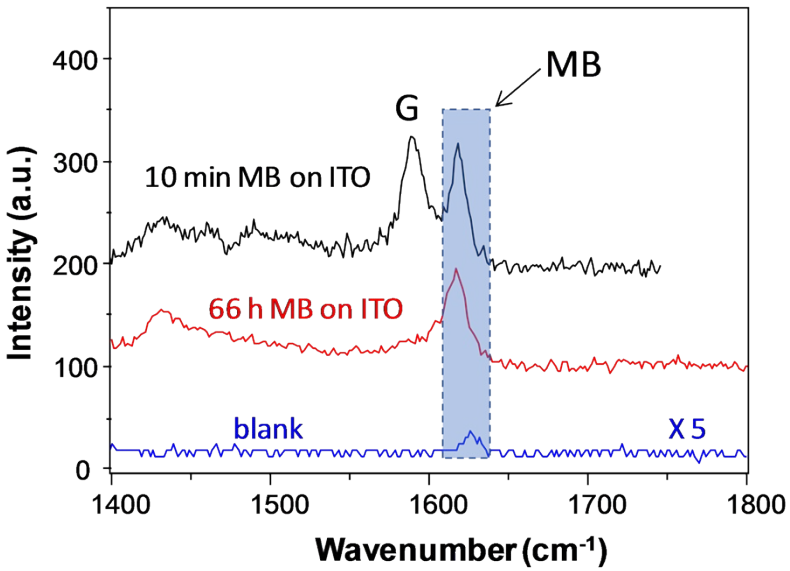

Figure S3. Selected Raman spectra for as-deposited Au NPs on graphene/ITO/glass and ITO/glass immersed in 0.3 mM MB solution during 10 min and 66 h, respectively along with a blank sample (bare ITO/glass immersed in MB).

Table S1. The table shows the immersion time, MB band position, Intensity, and SERS achieved by both platforms along with MB in solution used as a blank.

Sample	MB immersion time (min)	MB Band position (cm^{-1})	Intensity	SERS
MB (0.3 mM) solution	/	1624	8	/
MB + Au NPs on ITO/glass	10	1617	20	2.5
	3960	1622	98	12
MB + Au NPs on graphene	10	1617	68	8.5