Supporting Information

Analyte-Induced Disruption of Luminescence Quenching (AIDLuQ) for Femtomolar Detection of Biomarkers

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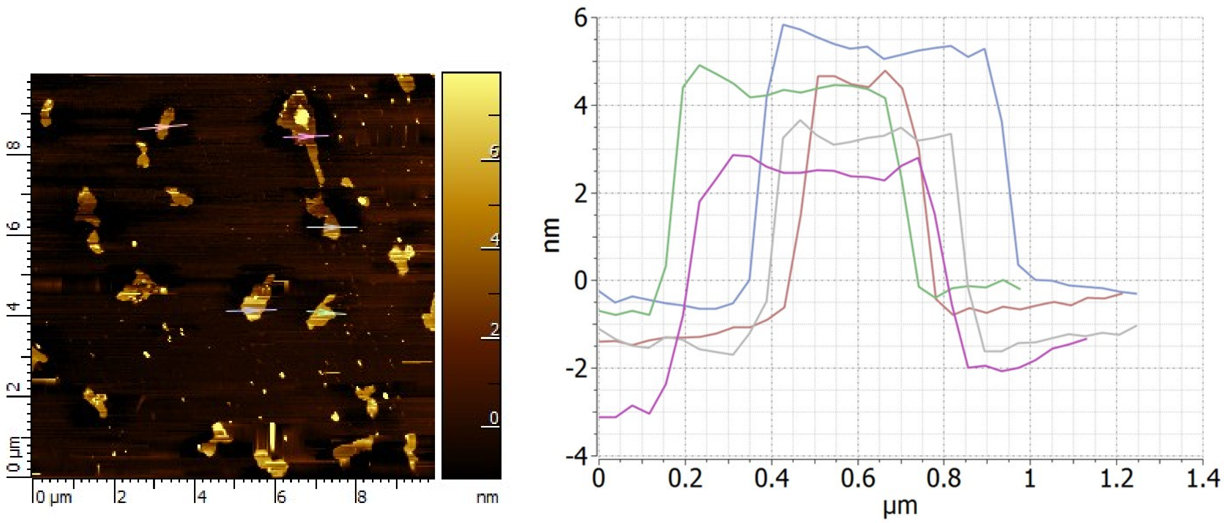


Figure S1: Atomic force microscopy images (left panel) and corresponding line scans (right panel) of graphene show that the flakes have an average thickness of ~5±1.5 nm.

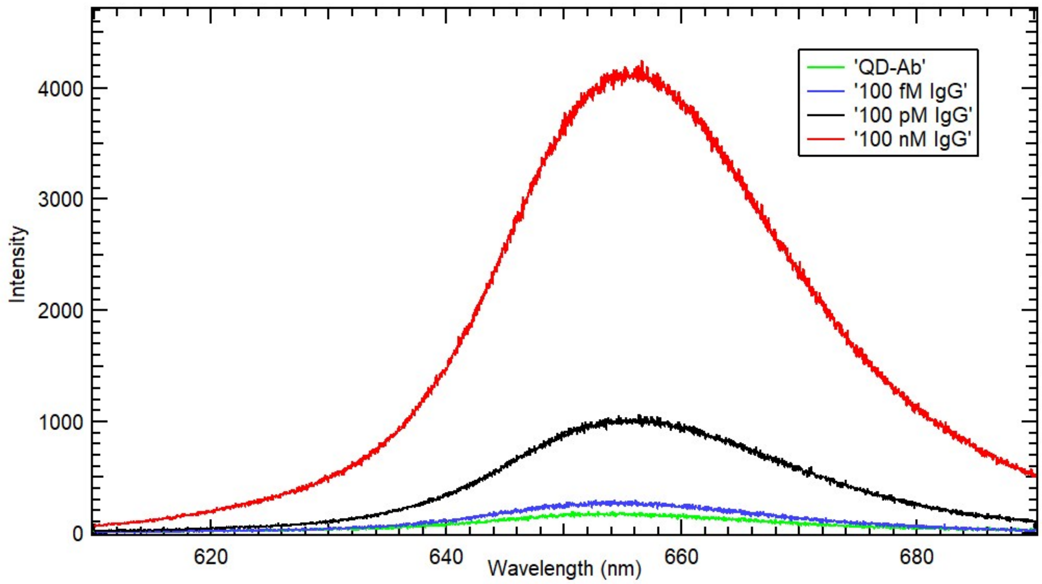
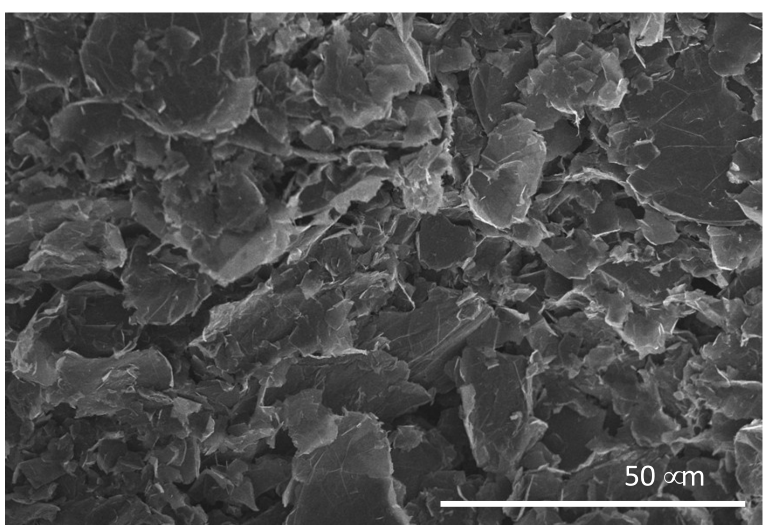


Figure S2: We performed a systematic study on the effect of Au NP density by varying itfrom 6,12, and 18 μg/cm^2. The lowest detectable IgG concentration for graphene-Au NP paper with an Au NP areal density of with 6 μg/cm^2 was found to be ~100 pM. This limit is higher than that of 18 μg/cm^2 (concentration reported in the study) because Au NPs are sparsely distributed. When the areal density of Au NPs was doubled to 12 μg/cm^2, we found that the sensitivity increased to ~100 fM (see the data above). When areal densities of Au NPs was higher than 18 μg/cm^2, graphene-Au papers were unstable and Au NPs washed away easily during incubation steps.



Figures S3: A representative scanning electron micrograph of graphene-Au NP paper.

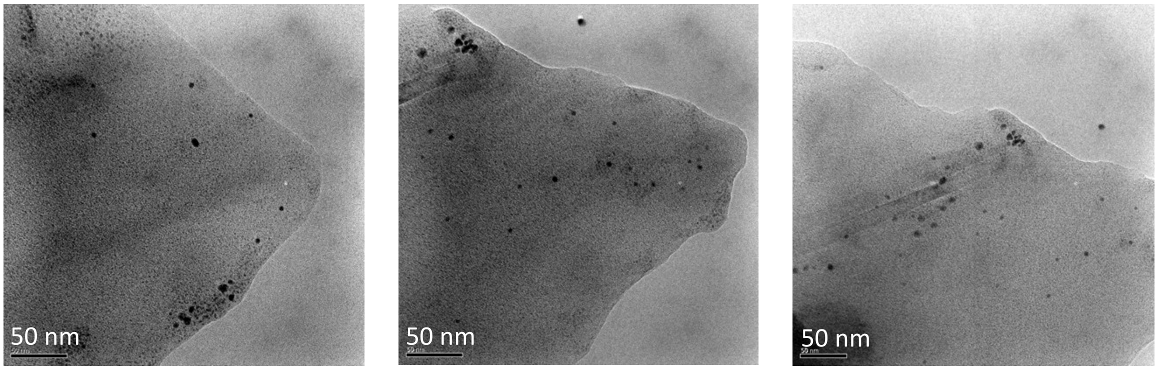


Figure S4: Transmission electron microscopy images of graphene-Au NP flakes

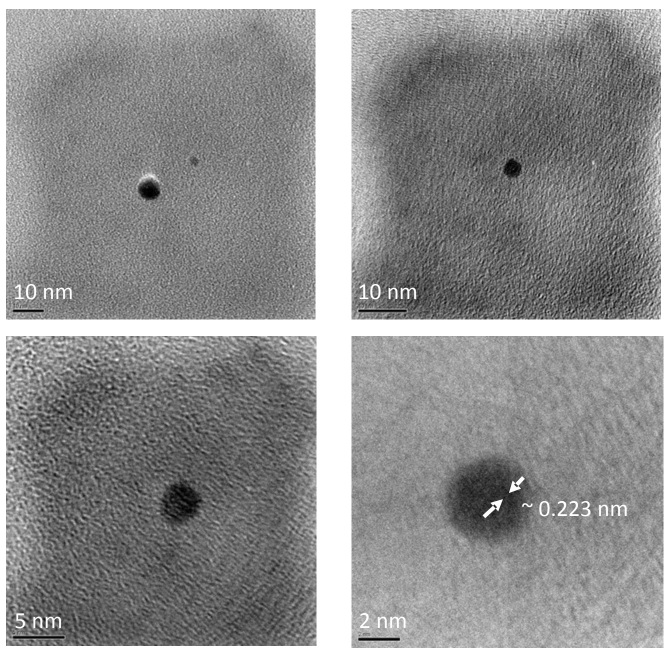


Figure S5: High-resolution transmission electron microscopy images of Au NPs.

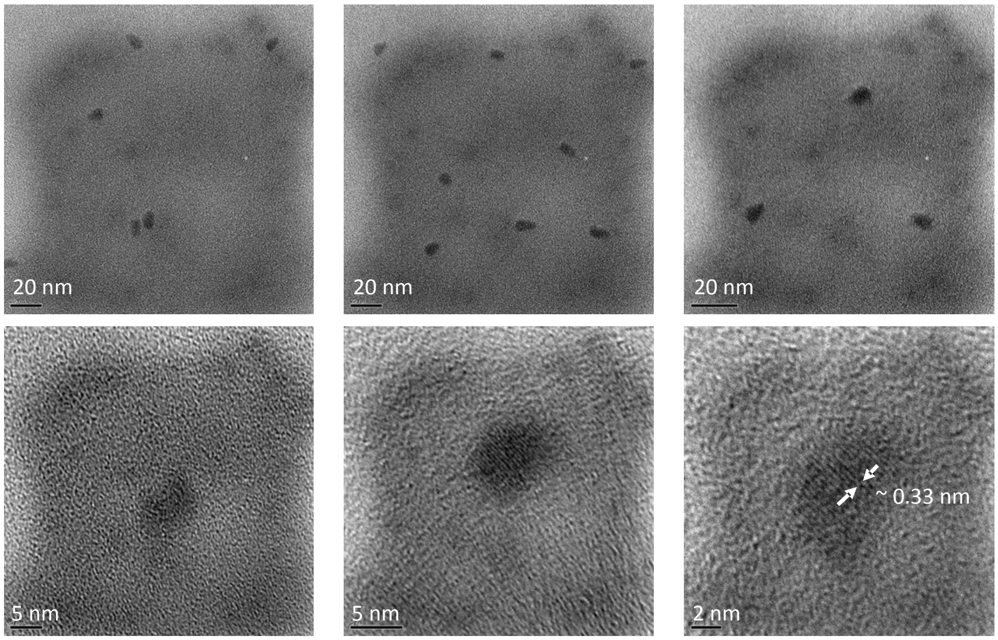


Figure S6: High-resolution transmission electron microscopy images of CdSe quantum dots

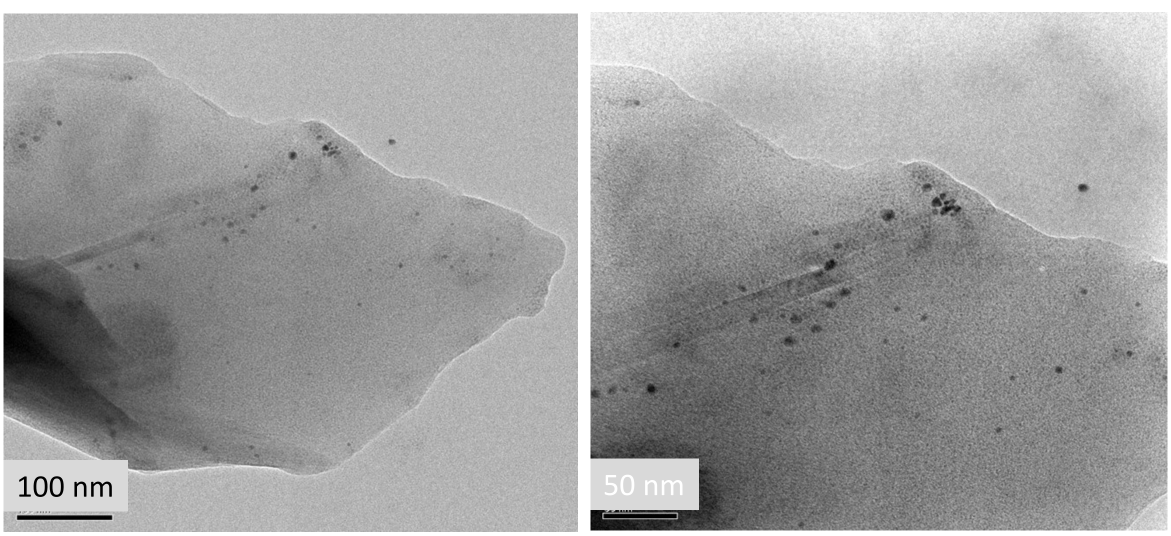


Figure S7: Transmission electron microscopy images of graphene-Au NP-CdSe-Ab

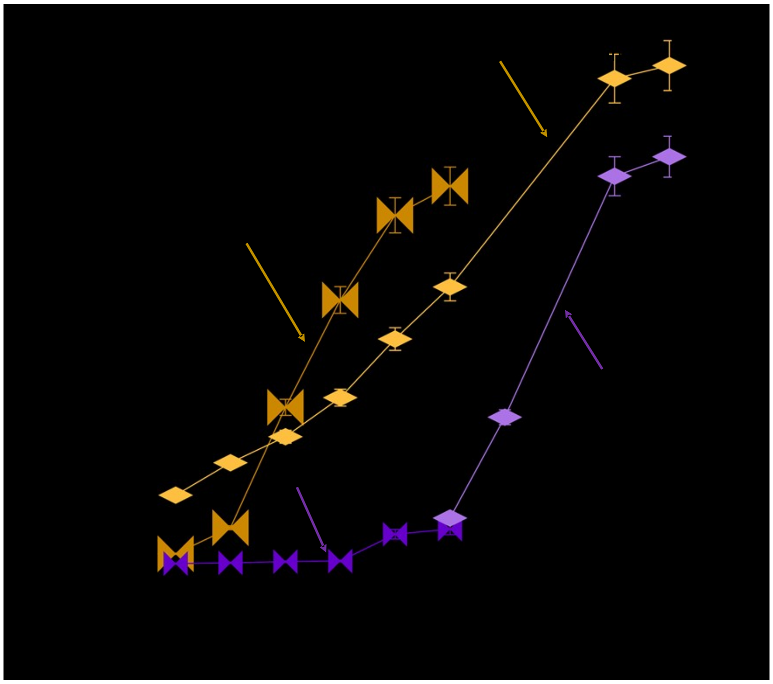


Figure S8: A comparison of graphene and graphene-Au NP platforms for sensing biotin and IgG analytes as described in Figs. 3c and 4c in the manuscript.

Table S1: A comparison of sensitivities reported for IgG

Reference	Sensitivity
This work	10 fM
Human IgG ELISA Kit (Abcam)	1.5 pM
NPG Asia Materials volume6, pagee112 (2014)	20 fM
Biosensors and Bioelectronics, 31(1), 233-239	1.1 pM
Nano Research 4, no. 10 (2011)	1-10 pM
Biosensors and Bioelectronics, 26(7), 3297-3302.	20 pM
Talanta, 83(1), 42-47.	20 pM
International journal of biological macromolecules, 43(2), 165-169.	0.1-10 nM
Sensors and Actuators B: Chemical, 74(1-3), 106-111.	0.2-2.7 nM
Journal of biophotonics, 9(3), 218-223.	5-200 nM
Microchimica Acta 183, no. 7 (2016): 2177-2184.	0.5 nM
Sensors, 17(4), 898.	0.1-1 nM