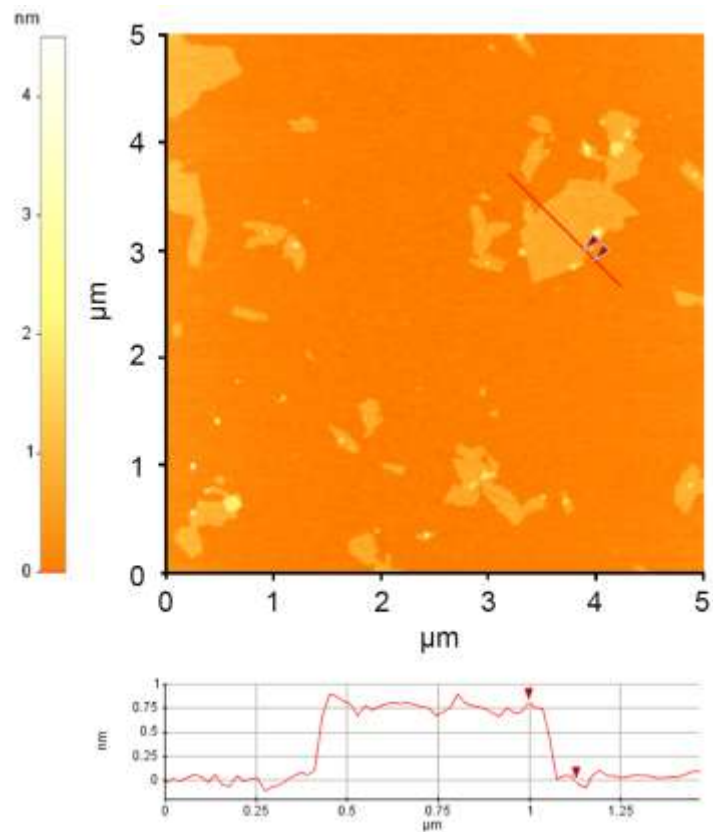


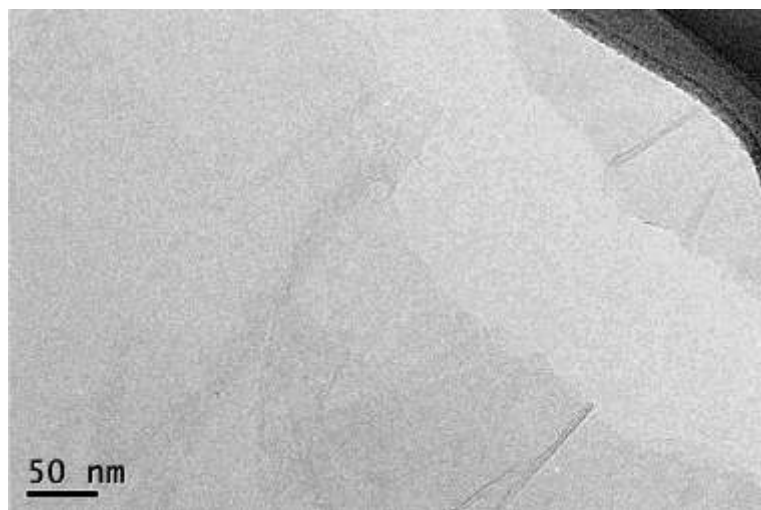
## Electronic supplementary information (ESI)

# **Site-specific immobilization of gold binding polypeptide on gold nanoparticle-coated graphene sheet for biosensor application**

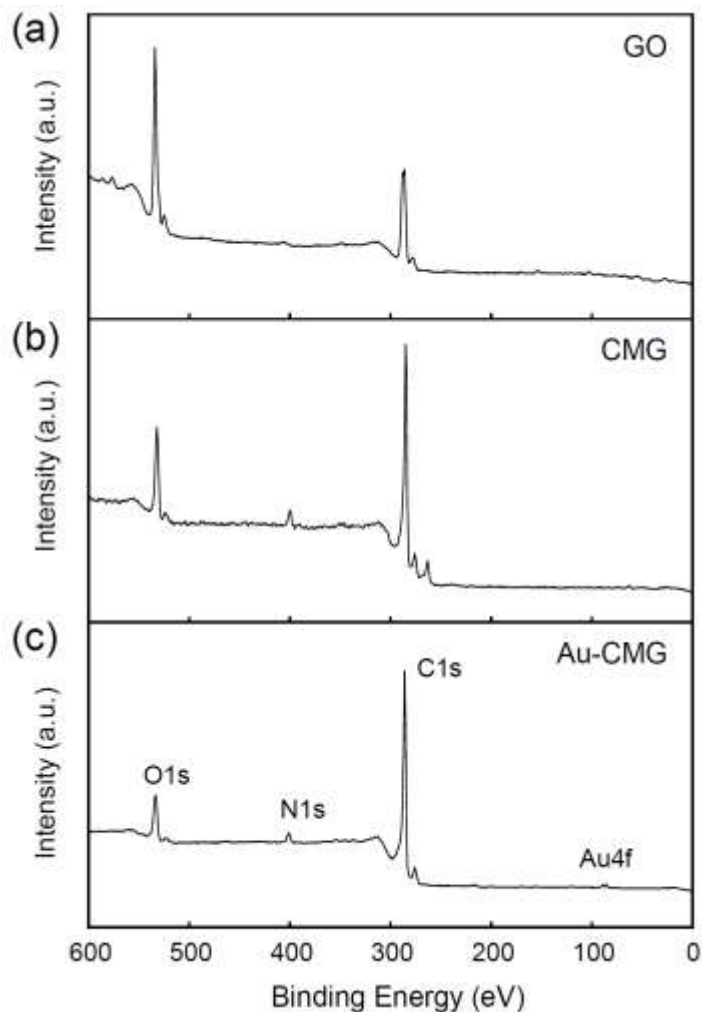
**MinHo Yang,<sup>a</sup> Bong Gill Choi,<sup>a</sup> Tae Jung Park,<sup>\*b</sup> Nam Su Heo,<sup>b</sup> Won Hi Hong<sup>a</sup> and Sang Yup Lee<sup>\*a,b</sup>**



**Fig. S1** AFM image of GO-monolayered sheet.

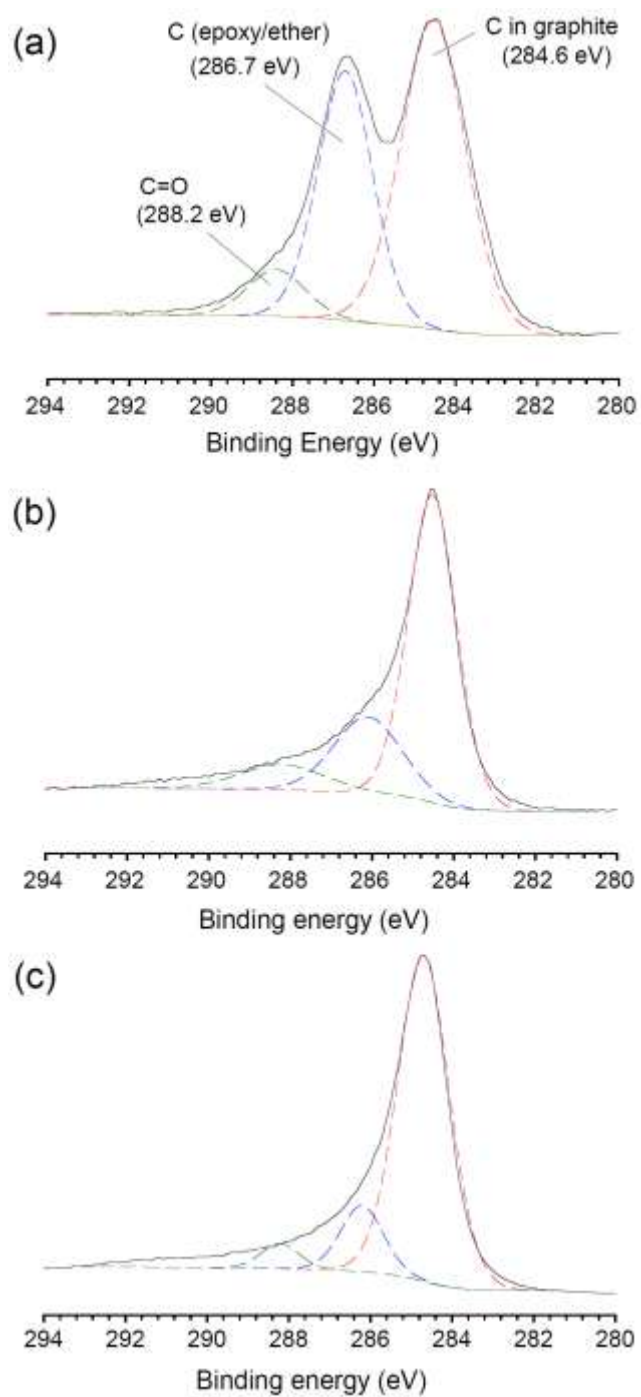


**Fig. S2** TEM image of GO single sheet.

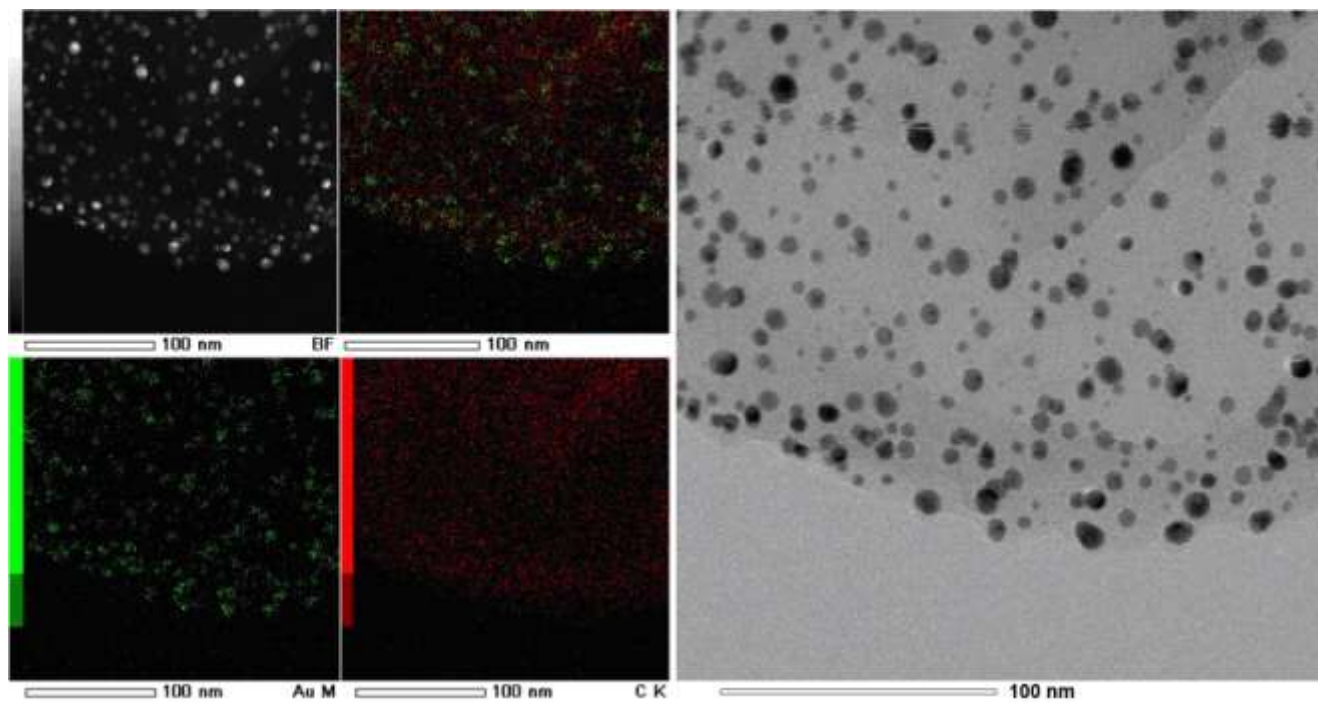


**Fig. S3** XPS data of (a) GO, (b) CMG and (c) Au-CMG hybrids.

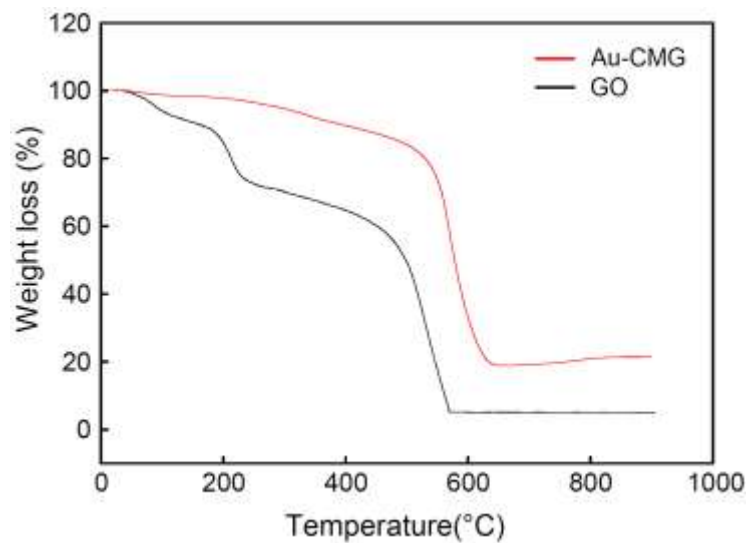
The survey scan XPS spectra showed the surface chemical states of GO, CMG, and Au-CMG hybrids; in comparison with the C1s spectrum of GO, those of CMG and Au-CMG clearly exhibited decreased peak intensities corresponding to epoxy/ether group (286.6 eV),<sup>1</sup> which indicates successful removal of oxygen groups on GO sheets after hydrazine treatment.



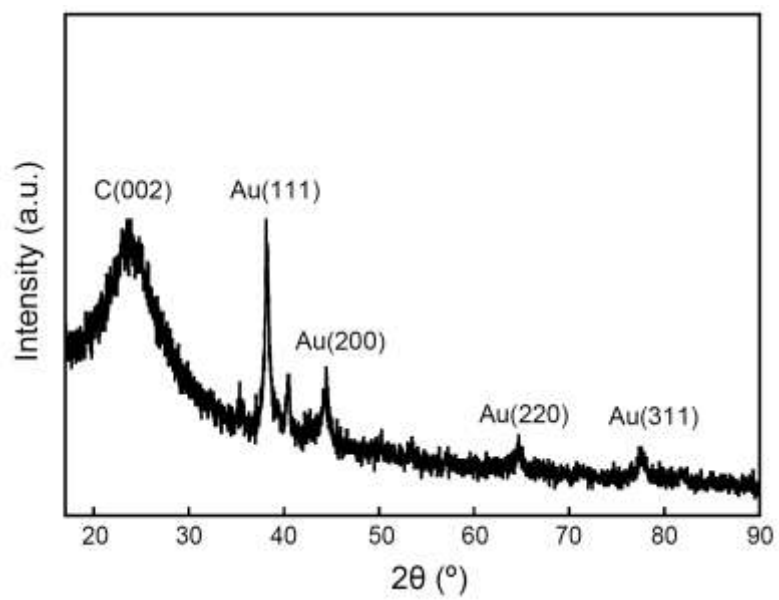
**Fig. S4** C1s XPS spectra of (a) GO, (b) CMG and (c) Au-CMG hybrids.



**Fig. S5** EDS mapping images from STEM and TEM images of Au-CMG hybrids.

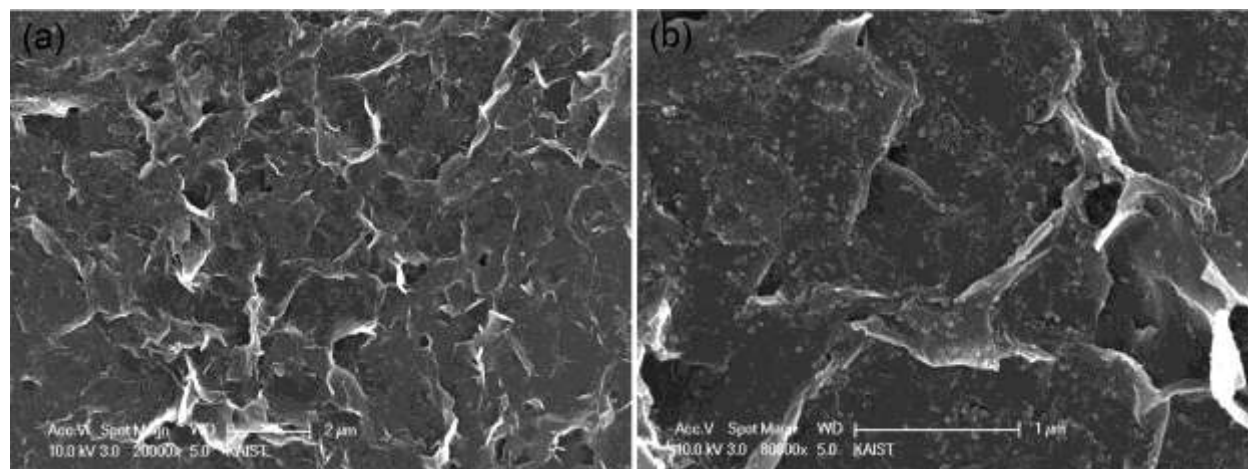


**Fig. S6** TGA curves of GO (black line) and Au-CMG (red line) hybrids.

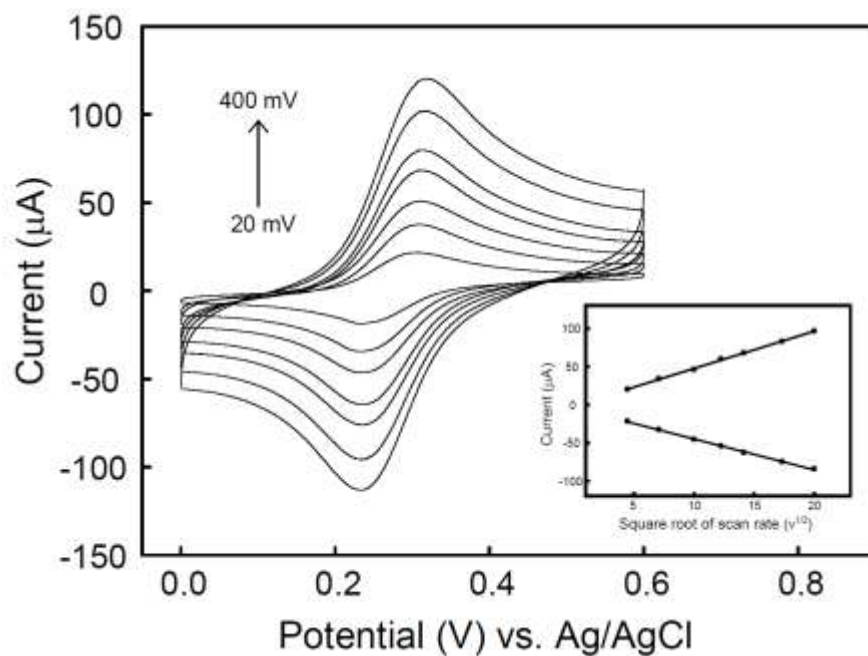


**Fig. S7** XRD pattern of Au-CMG hybrids.





**Fig. S8** SEM images of the electrode surface deposited with GBP-OPH/Au-CMG at (a) low magnification and (b) high magnification.



**Fig. S9** CVs of GBP-OPH/Au-CMG in 0.1 M KCl solution containing 5 mM Fe(CN)<sub>6</sub><sup>3-/4-</sup> at different scan rates (20, 50, 100, 150, 200, 300 and 400 mV s<sup>-1</sup>). The inset represents linear relationship of peak current versus square root of scan rate at GBP-OPH/Au-CMG hybrids.

**Table S1** Comparison of performance of the OPH biosensors by flow injection analysis

Electrode	Pesticide	Sensitivity (nA $\mu\text{M}^{-1}$ )	Linear range ( $\mu\text{M}$ )	Limit of detection (nM)	Reference
GBP-OPH/Au-CMG	Paraoxon	55.54	2–20	95.4	This work
OPH/MWNT/GCE*	Methyl parathion	6	2–10	800	2
	Paraoxon	25	2–4	150	
OPH on Au electrode	Paraoxon	2.29	1–10	100	3
Packed OPH/CPE <sup>†</sup>	Paraoxon	3.76	1–140	20	4
	Methyl parathion	3.15	1–140	20	

\*GCE: glassy carbon electrode, <sup>†</sup>CPE: carbon paste electrode

## Supplementary References

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