

Electronic Supplementary Information

Highly efficient colorimetric detection of target cancer cell utilizing superior catalytic activity of graphene oxide- magnetic-platinum nanohybrids

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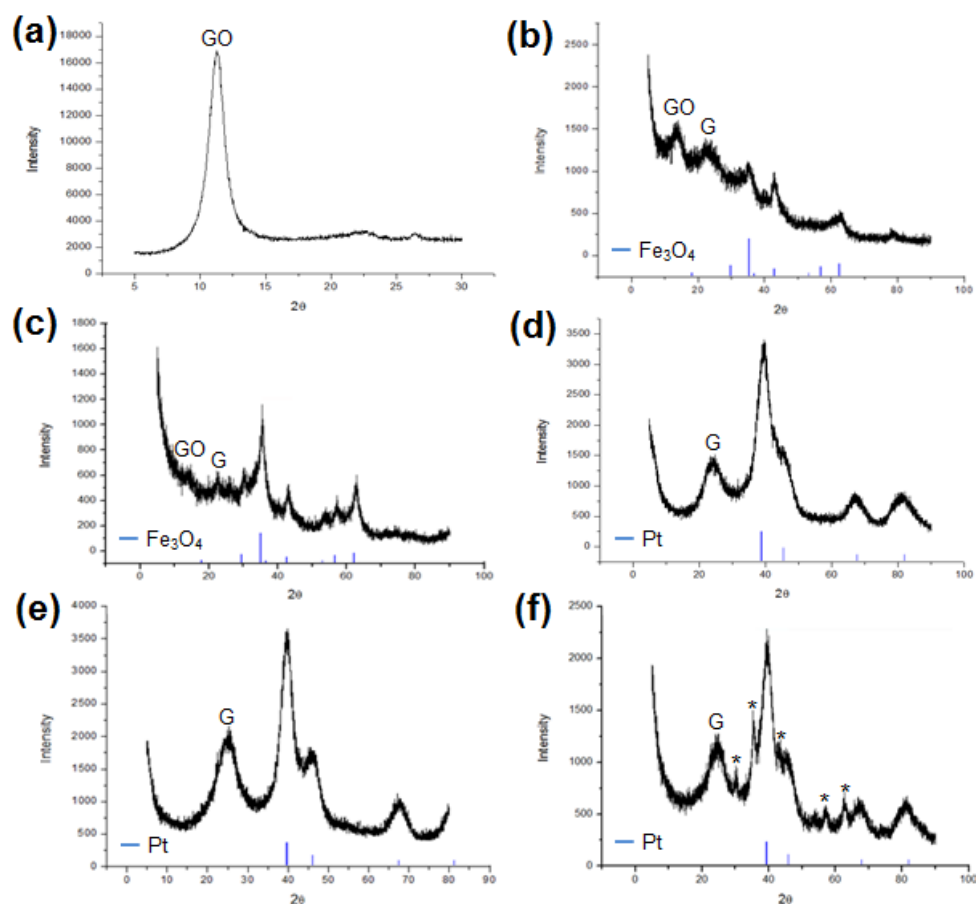


Fig. S1. XRD patterns of (a) graphene oxide (GO), (b) GO_MNP-10, (c) GO_MNP-30, (d) GO_Pt-10, (e) GO_MNP-10/Pt-10 and (f) GO_MNP-30/Pt-10 (asterisk was identified as Fe_3O_4). The peaks of GO and G correspond to graphene oxide and reduced graphene oxide, respectively. The peaks in the XRD patterns of b and c were found to match well with those present in standard MNP crystal structure data (Magnetite JCPDS, No. 89-0691); similarly, d, e and f were found to agree with Pt crystal structure data (Platinum JCPDS, No. 88-2343), which confirms MNP and Pt formation in GO. In the XRD pattern of GO_MNP-10/Pt-10, the typical peaks for Fe_3O_4 are not shown due to high intensities of Pt metals.

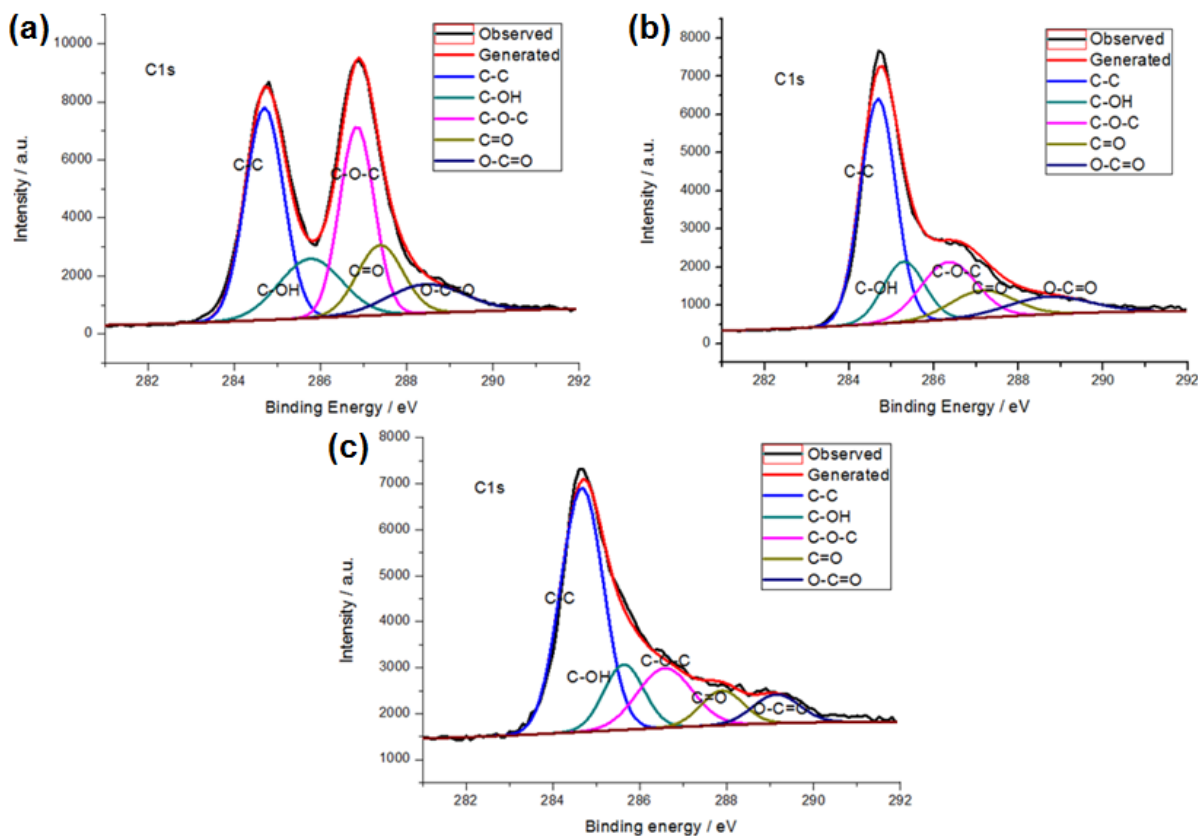


Fig. S2. XPS spectra of (a) graphene oxide (GO), (b) GO_MNP-10, and (c) GO_MNP-10/Pt-10.

Table S1. Relative atomic percentages of various functional groups in GO, GO_MNP-10, and GO_MNP-10/Pt-10.

Fitting of C1s (relative atomic percentage/%)					
	C-C	C-O	C-O-C	C=O	O-C=O
GO	34.34	15.65	27.54	13.40	9.27
GO_MNP-10	47.50	14.85	19.03	10.16	8.46
GO_MNP-10/Pt-10	54.66	13.62	17.08	7.66	6.98

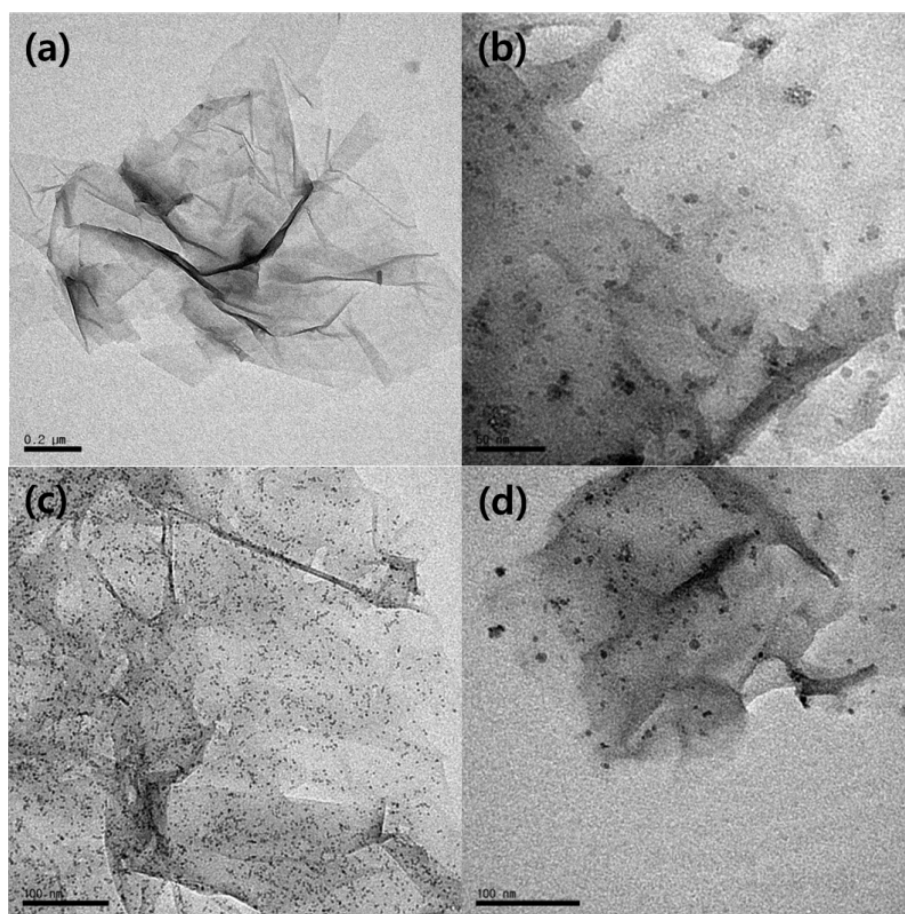


Fig. S3. TEM images of: (a) GO, (b) GO_MNP10, (c) GO_Pt10, and (d) GO_MNP-10/Pt-10. These TEM results indicate that Fe_3O_4 and Pt nanoparticles are well dispersed on all over graphene oxide nanosheets.

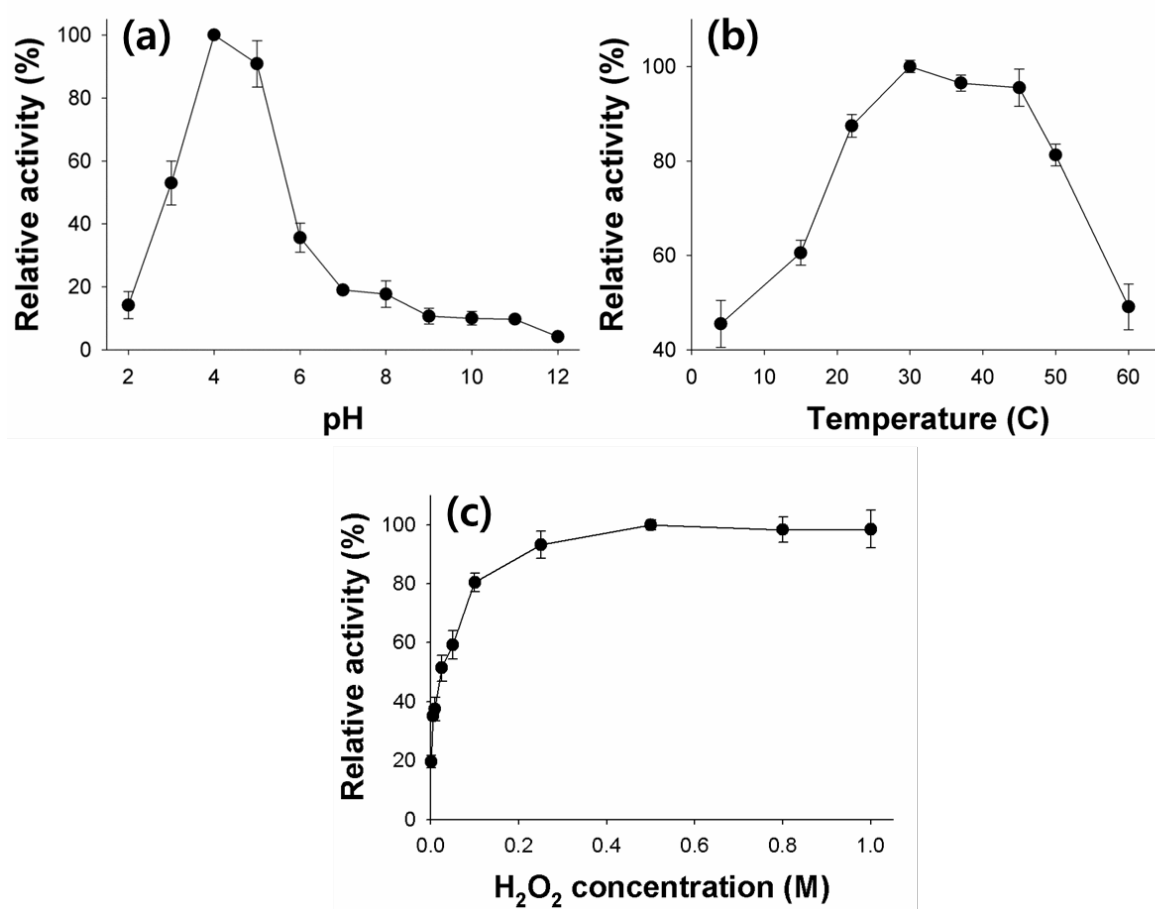


Fig. S4. Effects of (a) pH, (b) temperature, and (c) H_2O_2 concentration on the catalytic activity for TMB oxidation by GO_MNP-10/Pt-10 .

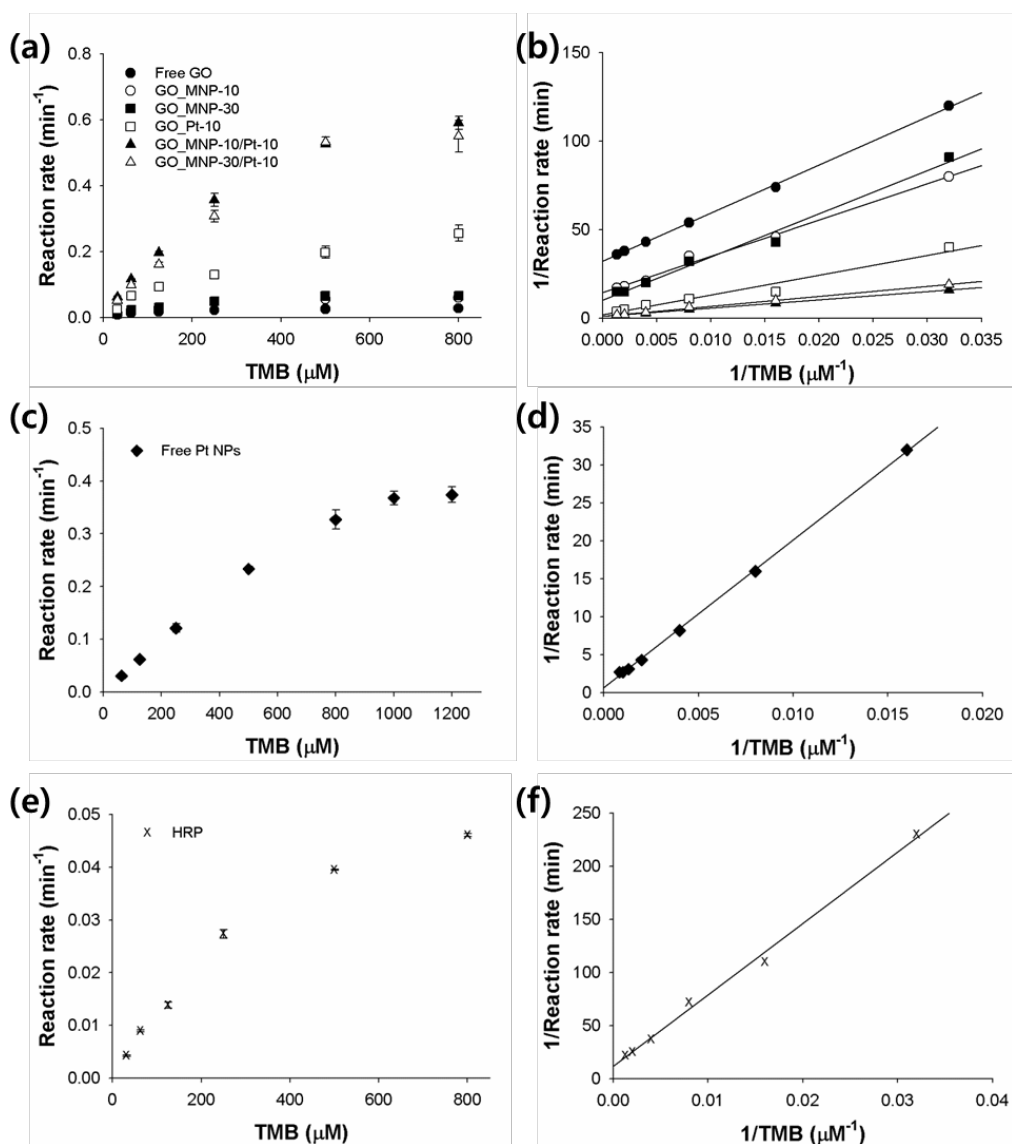


Fig. S5. Steady state kinetic assays of free GO, GO_MNP-10, GO_MNP-30, GO_Pt-10, GO_MNP-10/Pt-10, GO_MNP-30/Pt-10, Free Pt NPs, and HRP for TMB oxidation (a, c, and e), and their corresponding double reciprocal (Lineweaver-Burk) plots of activity (b, d, and f). Error bars represent standard errors derived from 3 independent measurements, and the y-axis values are obtained from the observed absorbance at 652 nm.

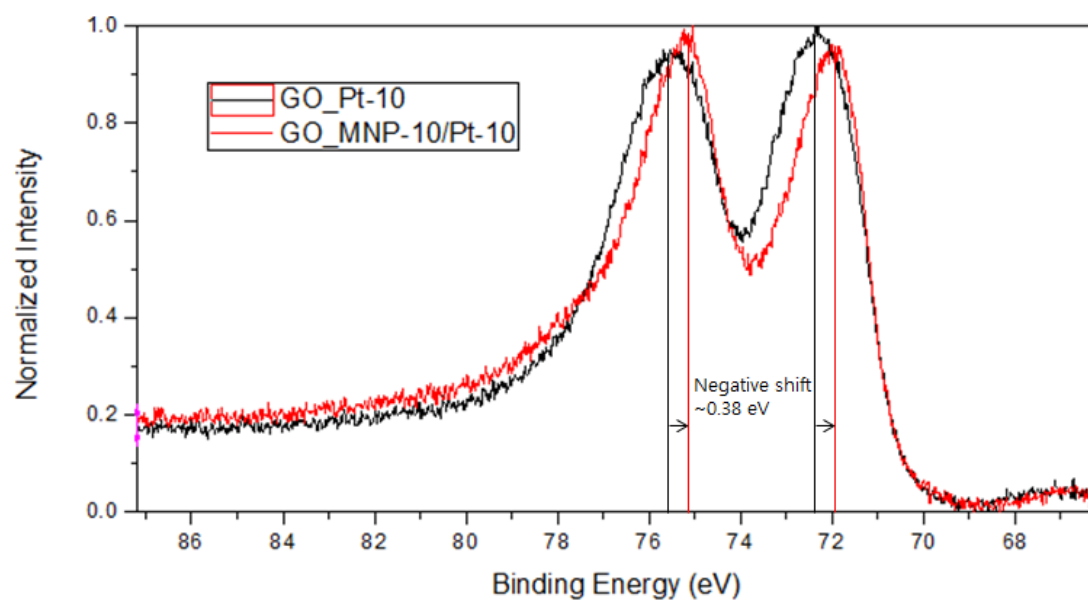


Fig. S6. Pt_{4f} XPS spectra of GO_Pt-10 and GO_MNP-10/Pt-10.

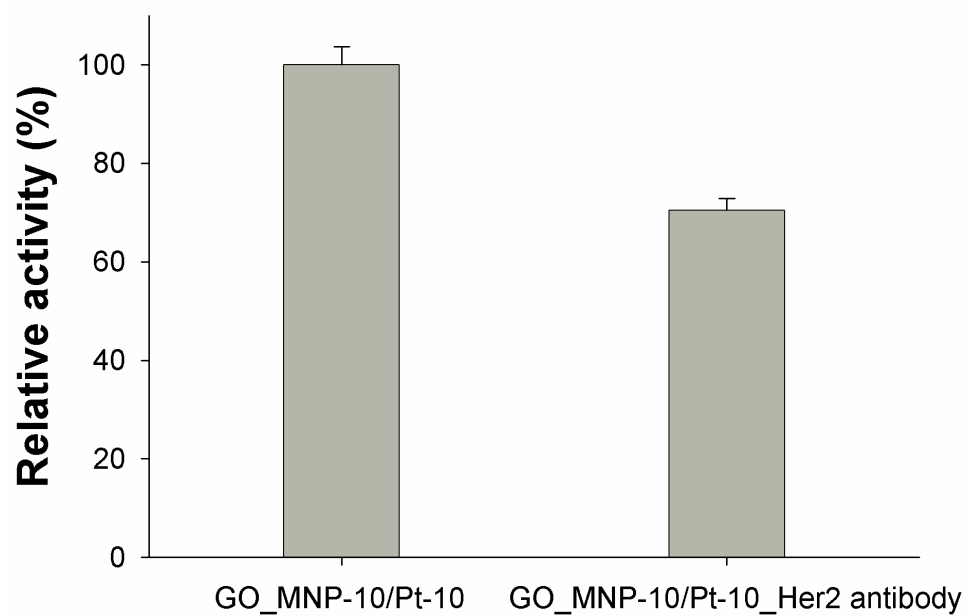


Fig. S7. Comparison of the initial activities of GO_MNP-10/Pt-10 and GO_MNP-10/Pt-10 conjugated to HER2 antibody.

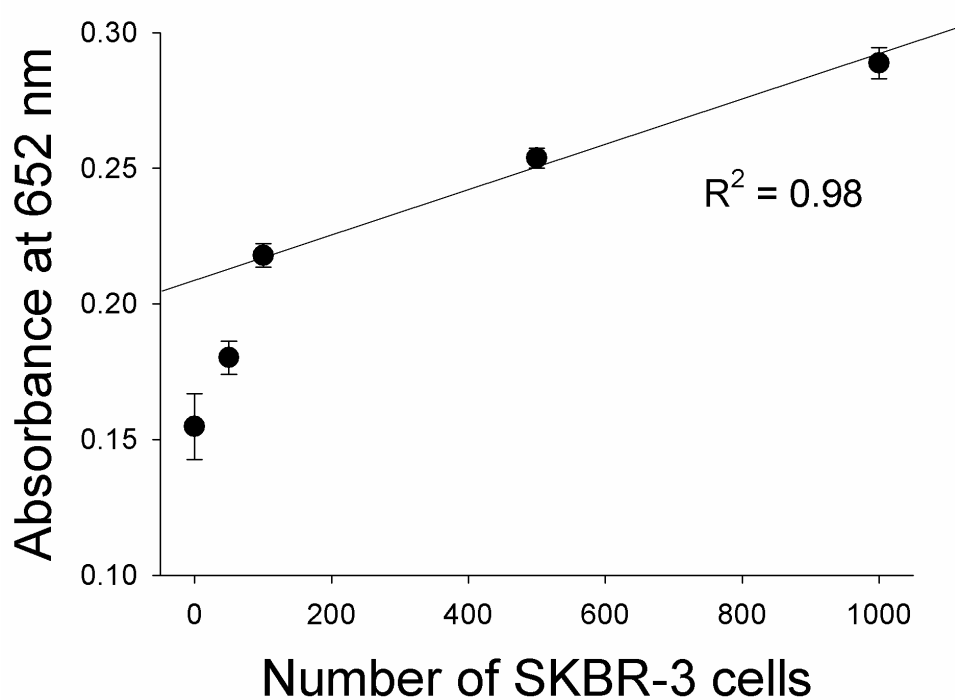


Fig. S8. Calibration curve showing relationship between the numbers of SKBR-3 cells and the absorbance intensity at 652 nm generated from the colorimetric assay using antibody-conjugated GO_MNP-10/Pt-10 nanohybrid.