Colorimetric detection of Hg^{2+} and Pb^{2+} based on peroxidase-like activity of graphene oxide-gold nanohybrids

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According to the Lineweaver-Burk equation[1] ($V = V_{max}C/(K_m+C)$, where V is the initial velocity, V_{max} is the maximal reaction velocity, C is the concentration of the substrate, and K_m is the Michaelis constant), the apparent Michaelis constant (K_m) and the maximal reaction velocity (V_{max}), considered to be the characteristics of enzyme reaction kinetics, were obtained and shown in Table S1.

Table S1. Comparison of the kinetic parameters of GO-AuNP nanohybrids and HRP.

	substrate	K_m (mM)	V_{max}(nM s^{-1})
GO-AuNP nanohybrids	TMB	4.92	46.43
HRP[2]	TMB	0.43	100.00

Table S2 Gold nanoparticle probes for colorimetric detection of Hg^{2+} and Pb^{2+}.

Probe	Target	LOD	Time	Real sample	Ref.
DNA-AuNPs	Hg^{2+}	100 nM	10 min	—	2
MPA-AuNPs	Hg^{2+}	100 nM	1 h	—	3
MPA-homocysteine-AuNPs	Hg^{2+}	10 nM	30 min	—	4
Apt/AuNPs	Hg^{2+}	1.0 μM	5.0 min	—	5
GO-AuNP nanohybrids	Hg^{2+}	300 nM	30 min	River water	this study
Peptide-AuNPs	Pb^{2+}	242 nM	1.0 min	—	6
DNA-AuNPs, DNAzyme and substrate	Pb^{2+}	10 μM	10 min	—	7
DNA-AuNPs, DNAzyme and substrate	Pb^{2+}	0.5 μM	15 min	Paint	8
DNA-AuNPs, DNAzyme and substrate	Pb^{2+}	0.4 μM	8.0 min	—	9
GO-AuNP nanohybrids	Pb^{2+}	500 nM	30 min	River water	this study

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