TABLE

Table S1 Detection performance of SOD by different analytical methods.

Sensing platform	Method	Detection pH	Detection range (μg/mL)	LOD (ng/mL)	Ref.
Mesoporous Pt /AuE	ECL	7.0	0.018-98	11	18
MWNT/nano-Au/GCE	ECL	-	1.6-162	8.1×10^{3}	71
PAAD/TiNTs/GCE	ECL	7.5	1.6-16	1.6×10^{4}	72
[DFIM][Tf_2N]-HGN/Nafion/GCE	ECL	-	0.36-4.6	140	73
DTT/Lucigenin	CL	11	1.0×10^{-2}–1.5	2.2	8
NHPI/Lucigenin	CL	11	0.01-0.25	3.0	74
NGQDs@NH_2-VMSF/ITO	ECL	7.4	5.0×10^{-3}-5.0	0.87	This work

Pt: Platinum; AuE: Au electrode; MWNT: multi-wall carbon nanotube; Nano-Au: Au nanoparticles; PAAD: polyamidoamine; TiNTs: titanate nanotubes; [DFIM][Tf_2N]-: 3-Decyl-1-(ferrocenylmethyl)-imidazolium bis(trifluoromethylsulfonyl) amide salts; HGN: Hydroxy-functionalized graphene; GCE: glassy carbon electrode; DTT: 1,4-Dithiothreitol; Lucigenin: N,N-dimethyl-9,9'-biacridinium dinitrate; NHPI: N-hydroxyphthalimide.

FIGURE

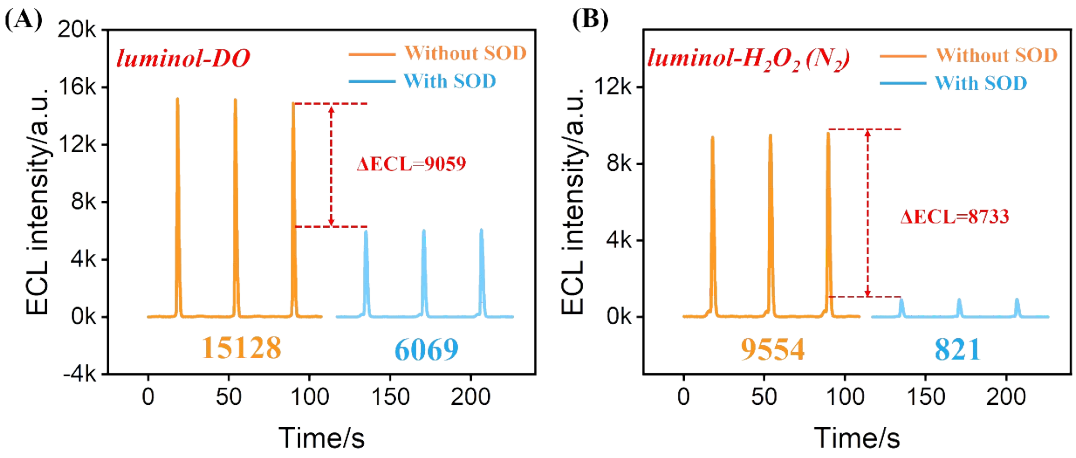

Figure S1 (A) ECL-time curve obtained on NGQDs@NH_2-VMSF/ITO electrode in luminol–DO system in absence or presence of SOD (5 ug/mL). The electrolyte in (A) was 100 μM luminol in 0.01 M PBS, pH=7.4. (B) ECL-time curve obtained on NGQDs@NH_2-VMSF/ITO electrode in luminol-H_2O_2 system (N_2-purged) without or with SOD (5 ug/mL). The electrolyte contained 100 μM luminol and 100 μM H_2O_2 in N_2-purged PBS (0.01 M, pH=7.4).

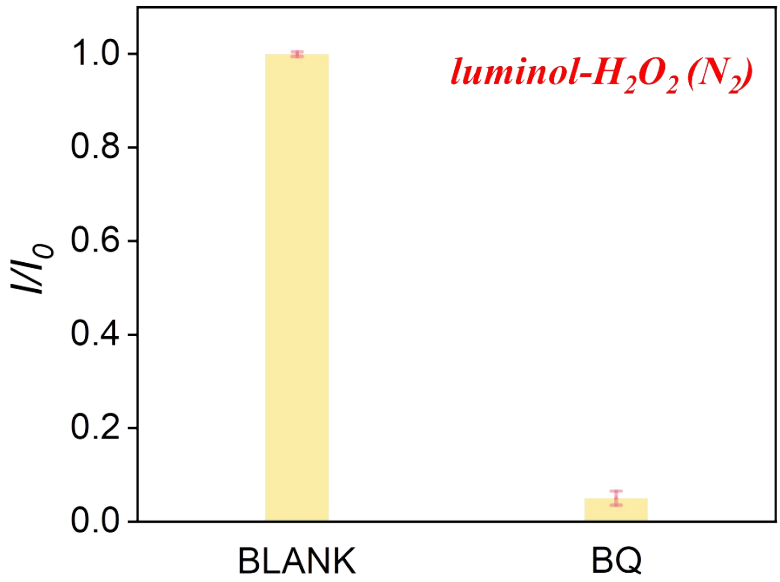

Figure S2 Changes in ECL intensity of NGQDs@NH_2-VMSF/ITO electrode in luminol-H_2O_2 system (N_2-purged) after the addition of BQ (100 μM). The electrolyte contained 100 μM luminol and 100 μM H_2O_2 in N_2-purged PBS (0.01 M, pH=7.4).

Step 1 ： The production of ROS

$$O_2 + e^- \xrightarrow{NGQDs} O_2^{\bullet -}$$

Step 2 ： ECL reaction

$$LH_2 - H^+ \rightarrow LH^-$$

$$LH^- - e^- - H^+ \rightarrow L^{\bullet -}$$

$$L^{\bullet -} + O_2^{\bullet -} \rightarrow AP^{2-*} + O_2$$

$$AP^{2-*} \rightarrow AP^{2-} + h\nu$$

Step 3 :SOD reaction with $O_2^{\bullet -}$

$$2O_2^{\bullet -} + 2H^+ \xrightarrow{SOD} O_2 + H_2O_2$$

Figure S3 Mechanism of ECL process and SOD-based quenching.