Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Cobalt(II)-8-hydroxyquinoline-5-sulfonic acid complex/N-(4-aminobutyl)-N-ethylisoluminol/reduced graphene hybrids as nanocatalytic reaction platforms for chemiluminescence

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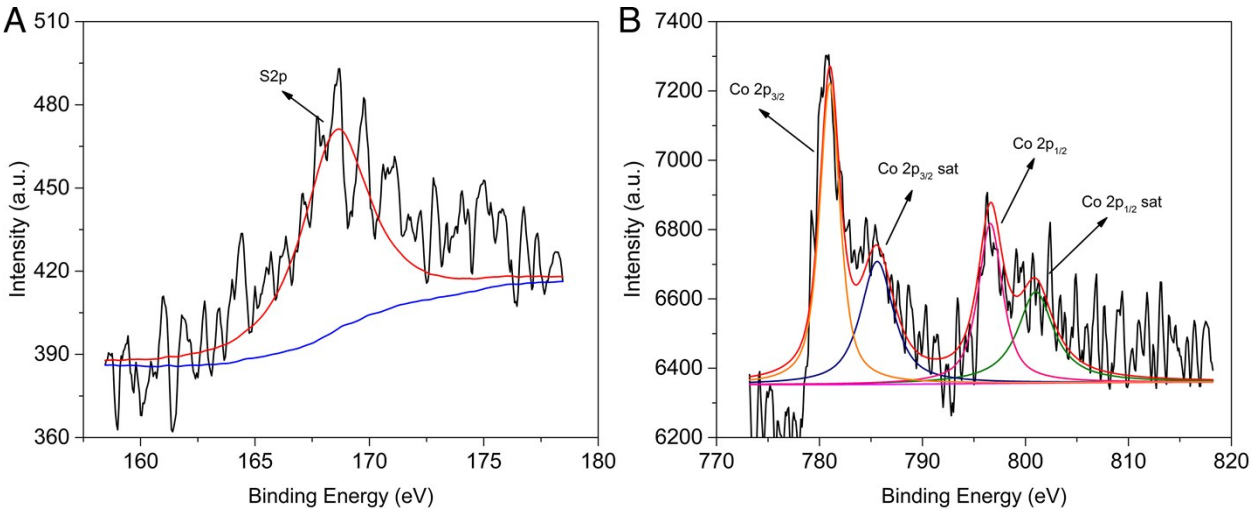

Figure S1. XPS survey of A) S 2p and B) Co 2p from $Co^{II}(HQS)_2$/ABEI/rGO.

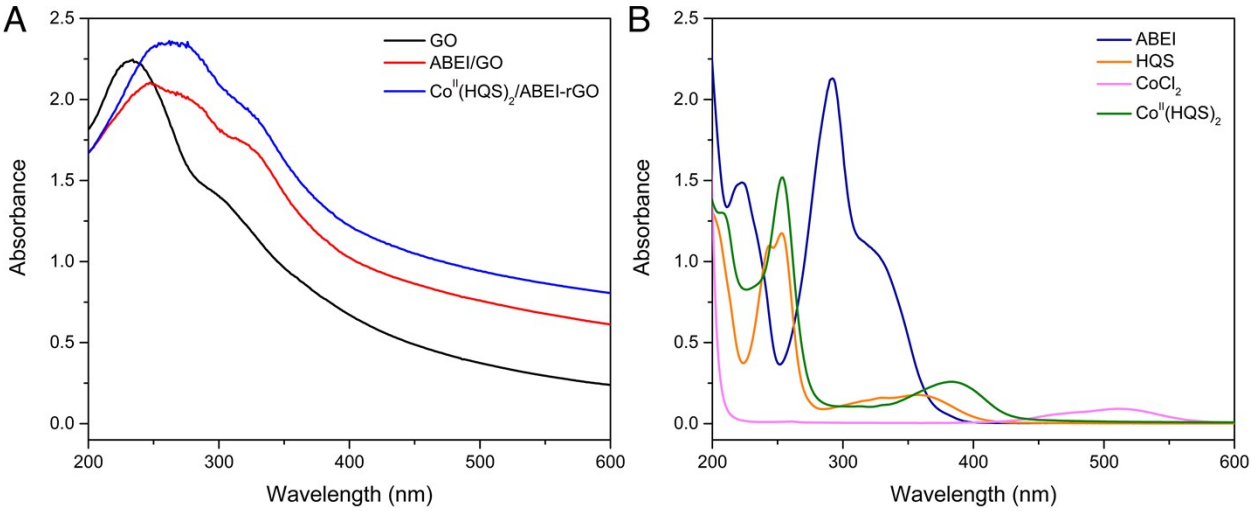

Figure S2. UV-vis absorption spectra of A) GO, ABEI/GO and $Co^{II}(HQS)_2$/ABEI/rGO, B) ABEI, HQS, $CoCl_2$ and $Co^{II}(HQS)_2$.

As shown in Figure S2, GO dispersion displayed a maximum absorption at 230 nm, which was due to the π-π* transition of aromatic C=C bonds, and a shoulder at around 300 nm corresponding to the n-π* transition of the C=O bonds.[1] The absorption peak of the $Co^{II}(HQS)_2$/ABEI/rGO dispersion at 230 nm gradually redshifted to 255 nm, suggesting that the electronic conjugation within the graphene platelets was restored upon hydrazine reduction, which was agreement with the Raman spectrum. Pure ABEI exhibited characteristic peaks around at 290 nm and 320 nm. Comparing to GO, ABEI/GO and $Co^{II}(HQS)_2$/ABEI/rGO showed an obviously increment of the shoulder absorption at around 300 nm, which indicated the existence of ABEI.

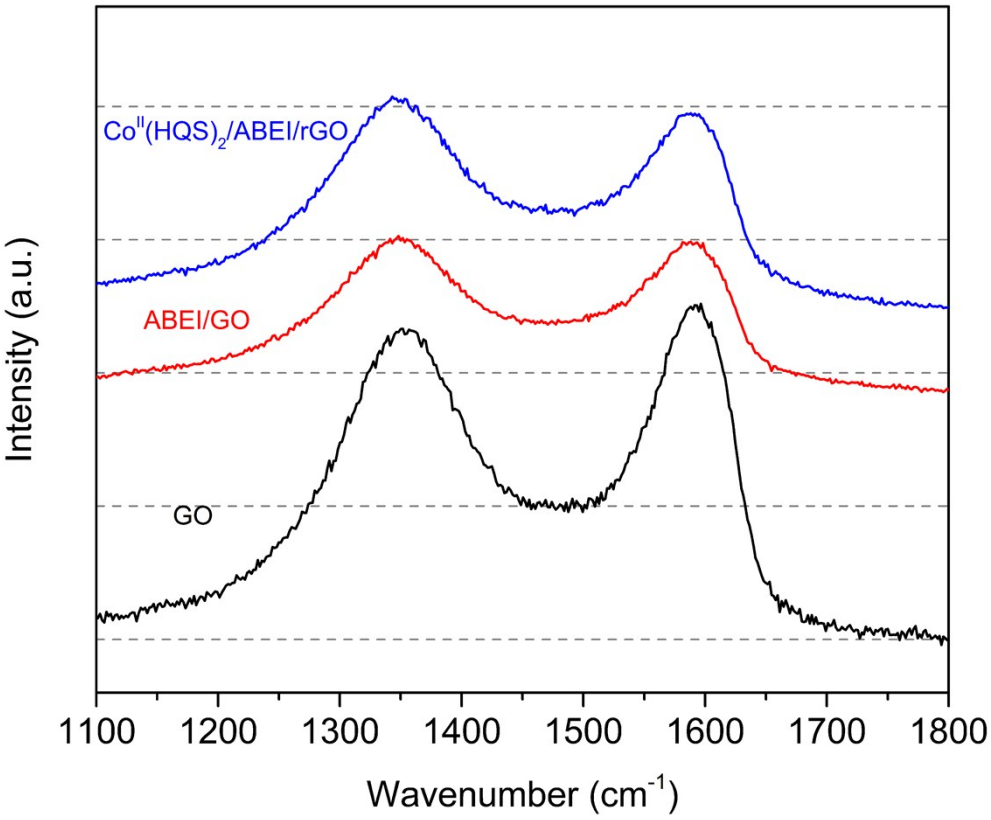

Figure S3. Raman spectra of GO, ABEI/GO and $Co^{II}(HQS)_2$/ABEI/rGO.

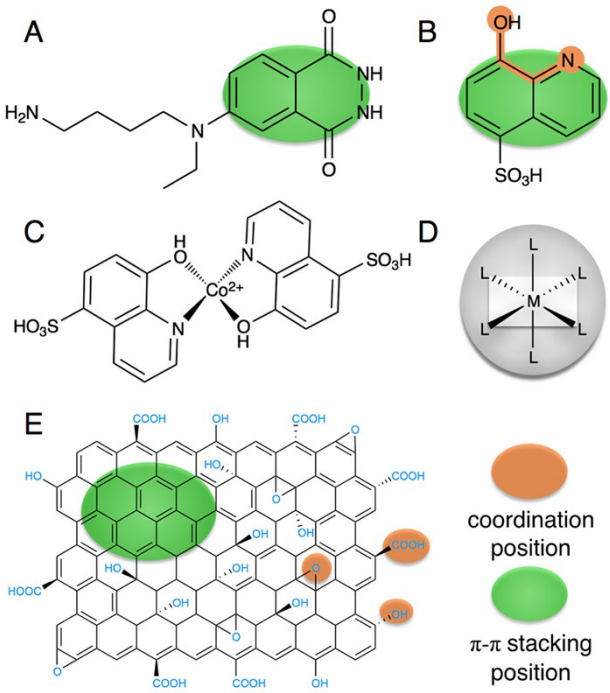

Figure S4. Structures of A) N-(4-aminobutyl)-N-ethylisoluminol, B) 8-hydroxyquinoline-5-sulfonic acid, C) $Co^{II}(HQS)_2$ complex, D) octahedral coordination complex and E) graphene oxide.

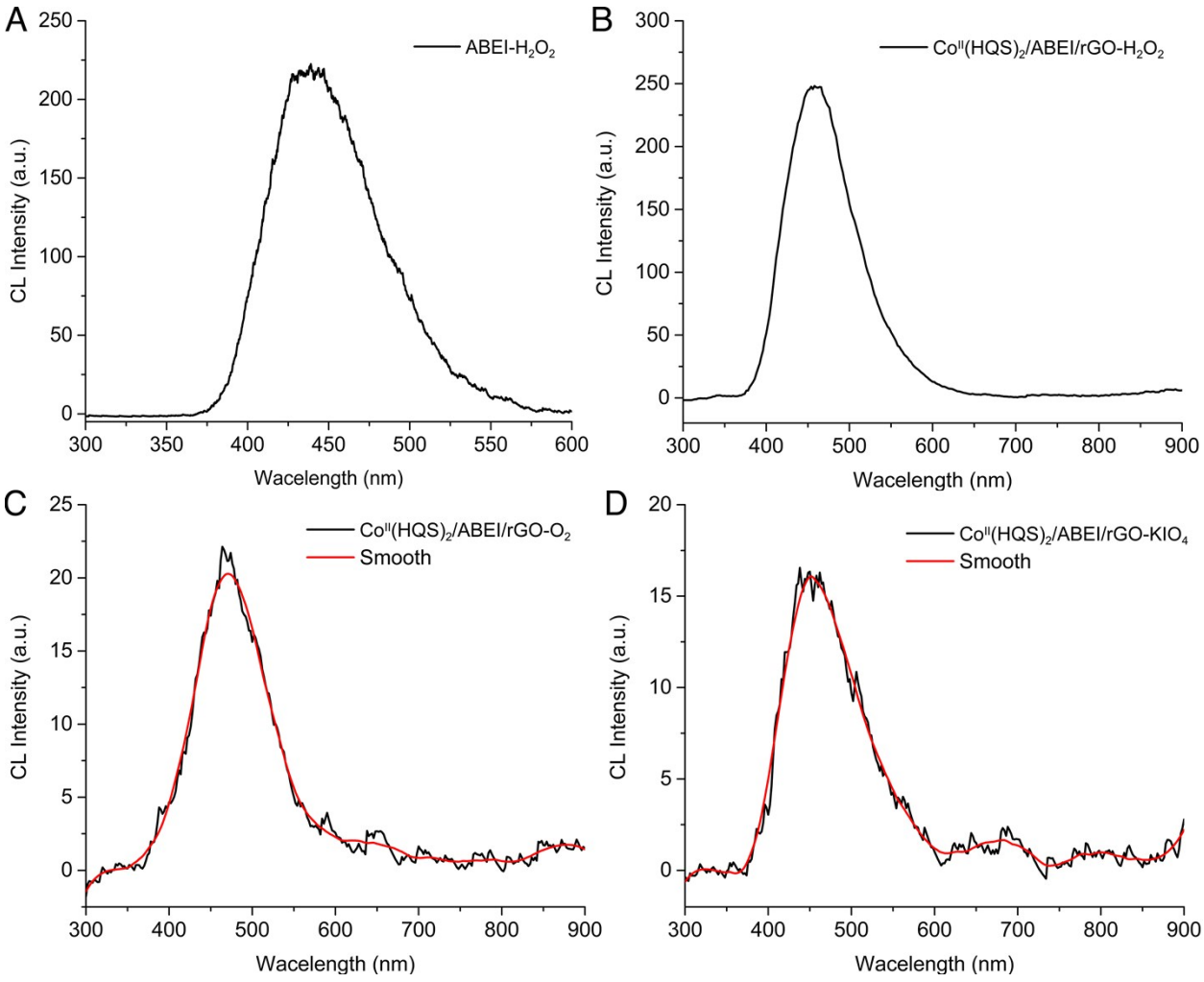

Figure S5. CL spectra for reaction of A) ABEI with H_2O_2, B) $Co^{II}(HQS)_2$/ABEI/rGO with H_2O_2， C) $Co^{II}(HQS)_2$/ABEI/rGO with dissolved oxygen and D) $Co^{II}(HQS)_2$/ABEI/rGO with KIO_4 in alkaline conditions,

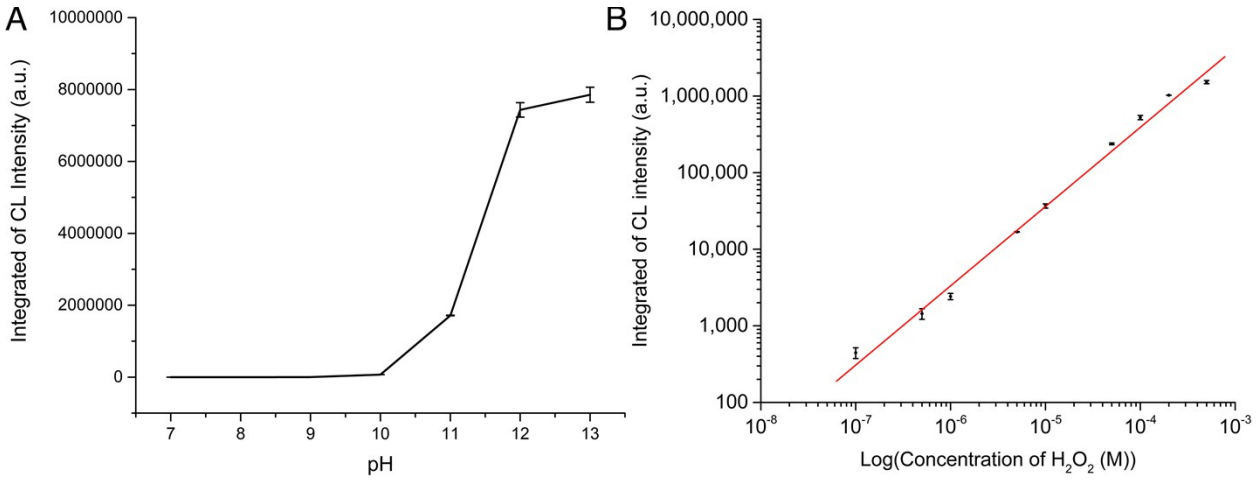

Figure S6. Effect of (A) pH and (B) concentration of H_2O_2 on CL intensity of $Co^{II}(HQS)_2$/ABEI/rGO-H_2O_2. Reaction conditions: A) 0.1 mM H_2O_2 and B) 0.01 M NaOH.

The logarithm of integrated of CL intensity increased linearly with the logarithm of the concentration of H_2O_2 in the range of 0.1 μM to 0.5 mM. The regression equation was Log I = 9.74652 + 1.03437 × log C with a correlation coefficient of 0.9917, where I refers to integrated of CL intensity with 5 seconds and C the concentration of H_2O_2. The limit of detection (LOD) for H_2O_2 was 0.08 μM (LOD is defined as the concentration corresponding to bank signal +3σ, σ is the standard deviation of blank).

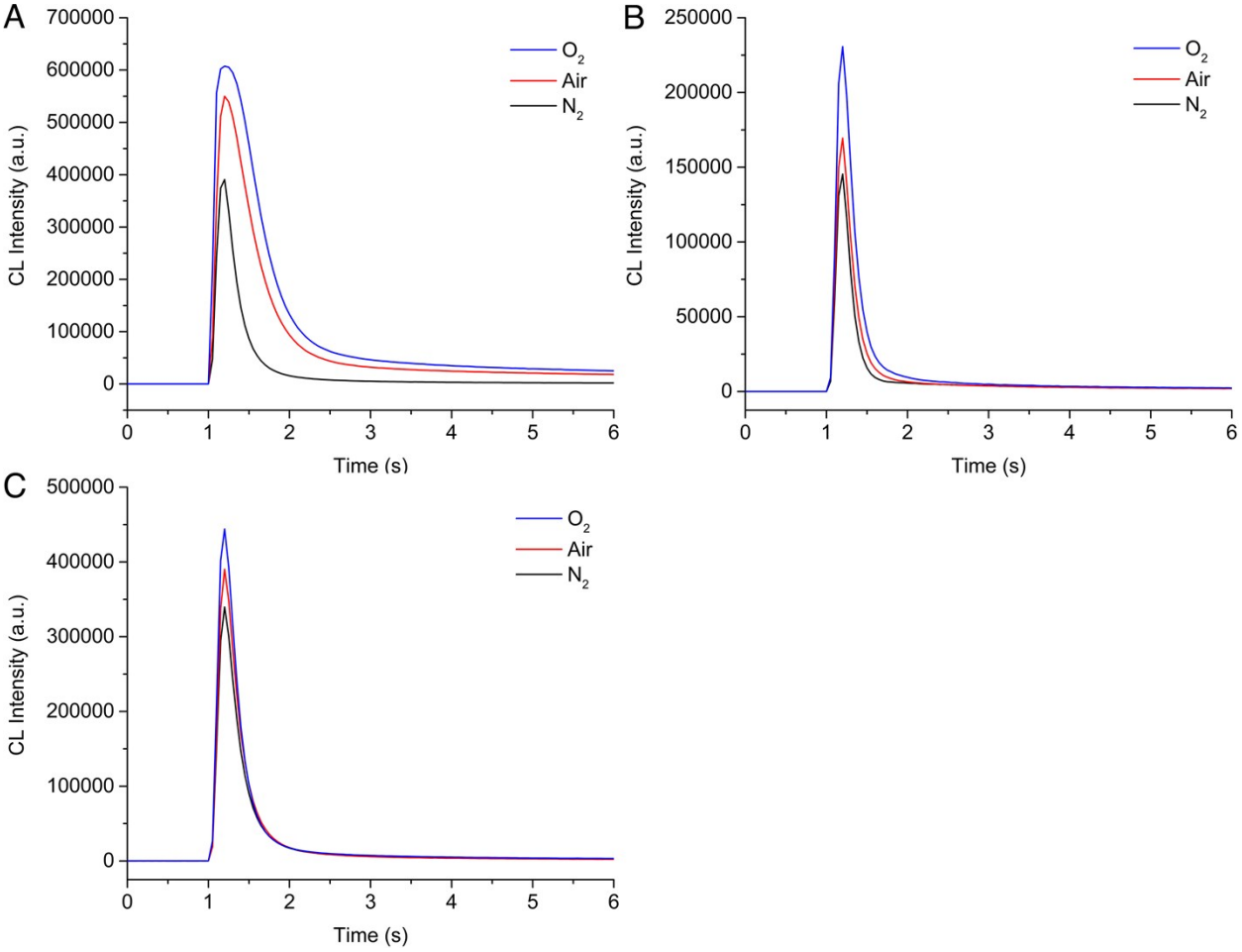

Figure S7. CL kinetic curves for reaction of $Co^{II}(HQS)_2$/ABEI/rGO with A) H_2O_2, B) dissolved oxygen and C) KIO_4 under oxygen-saturated (blue), air-saturated (red) and nitrogen-saturated solutions (black), respectively. Reaction conditions: A) 0.1 mM H_2O_2 in 0.01 M NaOH, B) 0.1 M NaOH and C) 0.05 mM KIO_4 in 0.05 NaOH.

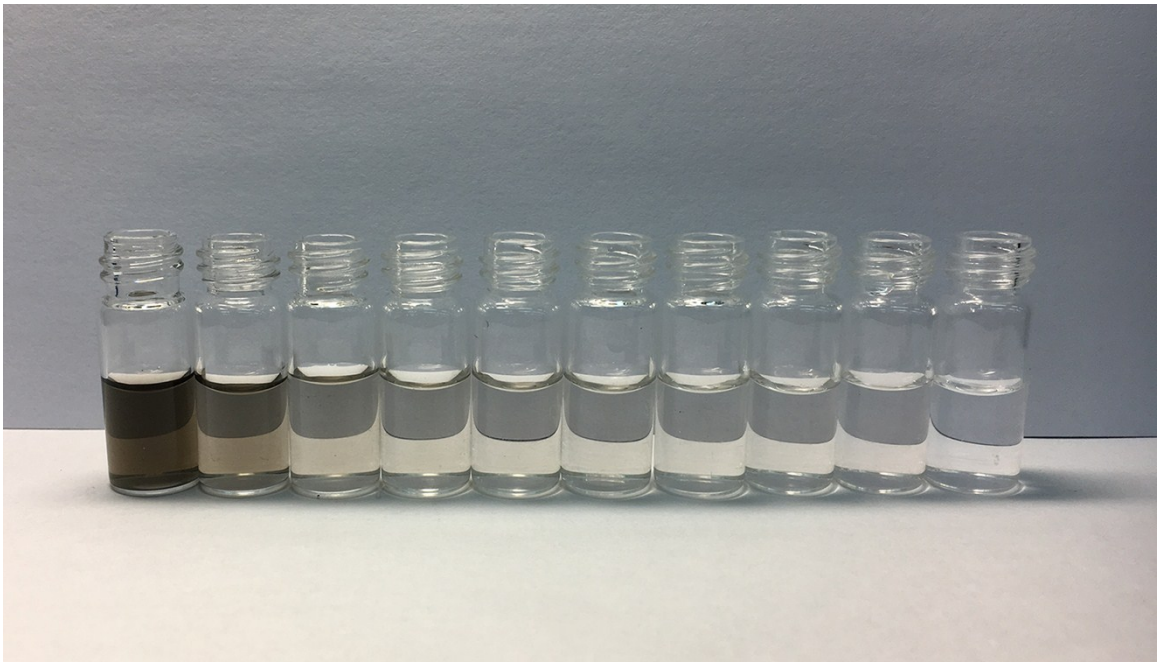

Figure S8. Picture of $Co^{II}(HQS)_2$/ABEI/rGO with different dilution times (left to right: 1, 2, 4, 6, 8, 10, 15, 20, 30 and water).

REFERENCE

1. D. Li, M. B. Mueller, S. Gilje, R. B. Kaner, G. G. Wallace,. *Nat. Nanotechnol.*, 2008, **3**, 101-105.