Electronic Supplementary Information (ESI)

N-(4-Aminobutyl)-N-ethylisoluminol/CoFe$_2$O$_4$/graphene hybrids

with unique chemiluminescence and magnetism

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Fig. S1 Raman spectra of GO (a), ABEI/CoFe$_2$O$_4$/GNs (b) and graphene (c).

Fig. S2 Nitrogen adsorption/desorption isotherms of ABEI/CoFe$_2$O$_4$/GNs. Inset: pore size distribution.
Fig. S3 Effect of ABEI (A), CoFe$_2$O$_4$ (B) and GNs (C) concentration on CL intensity.

Effect of CoFe$_2$O$_4$ (D) concentration on magnetism of ABEI/CoFe$_2$O$_4$/GNs.
The CL response increased with H$_2$O$_2$ concentration from 0.0001 to 1 mM. When H$_2$O$_2$ concentration further increased to 10 mM, and the CL intensity was decreased. Thus 1 mM H$_2$O$_2$ was select as optimized conditions for the ABEI/CoFe$_2$O$_4$/GNs mediated CL reaction. The CL response increased with solution pH to 13. The higher solution pH will corrode the injector of luminometer and the obtained CL intensity at pH 13 was strong enough, thus pH 13 was select as optimized conditions for the ABEI/CoFe$_2$O$_4$/GNs mediated CL reaction.
**Fig. S5** CL intensity reproducibility with five batches of the ABEI/CoFe$_2$O$_4$/GNs

**Fig. S6** $I_{ECL}$–E curves of ABEI/CoFe$_2$O$_4$/GNs under O$_2$ (a), air-saturated (b) and N$_2$ (c) atmospheres. Inset: the enlarged $I_{ECL}$–E curves of a, b and c from -0.6 to -1.3 V. Initial potential, 0 V; high potential, 1.3 V; low potential, -1.3 V. Initial scan direction: negative. Photomultiplier tube voltage: -500 V.
Fig. S7 Effect of pH on $I_{\text{ECL}}-E$ curves of ABEI/CoFe$_2$O$_4$/GNs. Inset: the enlarged $I_{\text{ECL}}-E$ curves of pH 7.43 and pH 8.26. Initial potential, 0 V; high potential, 1.3 V; low potential, -1.3 V. Initial scan direction: negative. Photomultiplier tube voltage: -500 V.

Fig. S8 ECL intensity reproducibility of the ABEI/CoFe$_2$O$_4$/GNs with five batches.