

Electronic Supplementary Information

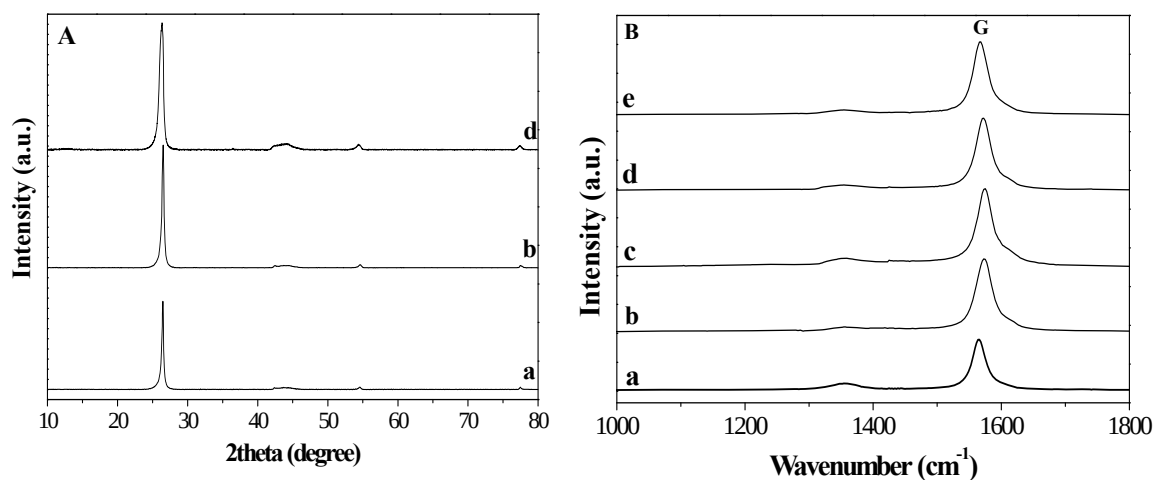
Enhanced visible photocatalytic activity of nanocrystalline α -Fe₂O₃ by coupling phosphate-functionalized graphene

Lumei He, Liqiang Jing*, Zhijun Li, Wanting Sun, and Chong Liu

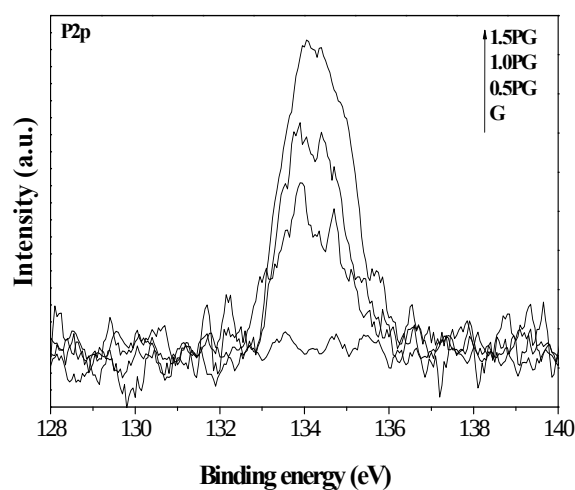
*Key Laboratory of Functional Inorganic Materials Chemistry
(Heilongjiang University), Ministry of Education, School of Chemistry
and Materials Science,
Harbin 150080, P. R. China.*

**Email: jinglq@hlju.edu.cn.*

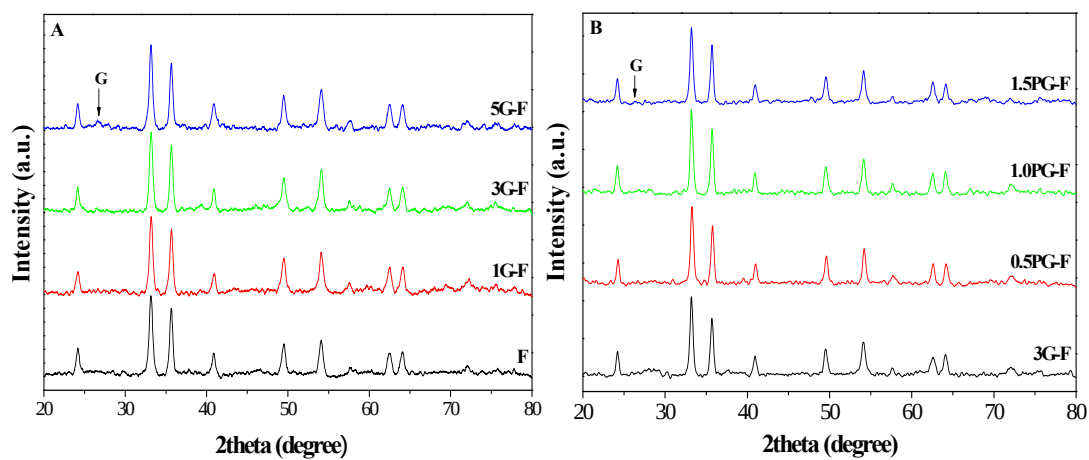
ESI-Figures:



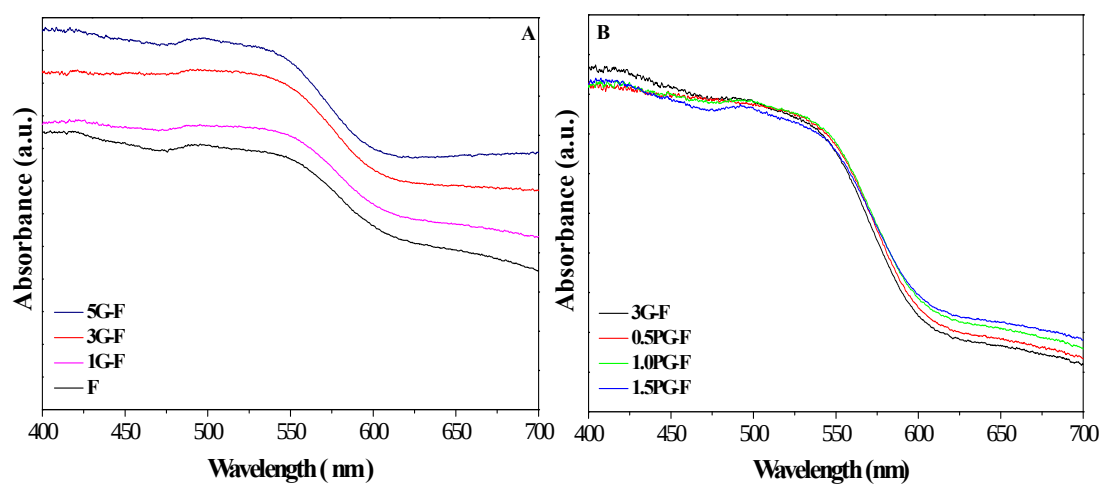
ESI-Figure 1 XRD patterns (A) and Raman spectra (B) of graphenes (a: un-pretreated, b: pretreated as G, and c-e: phosphate-functionalized with 0.5 M, 1.0 M and 1.5 M phosphoric acid as PG).



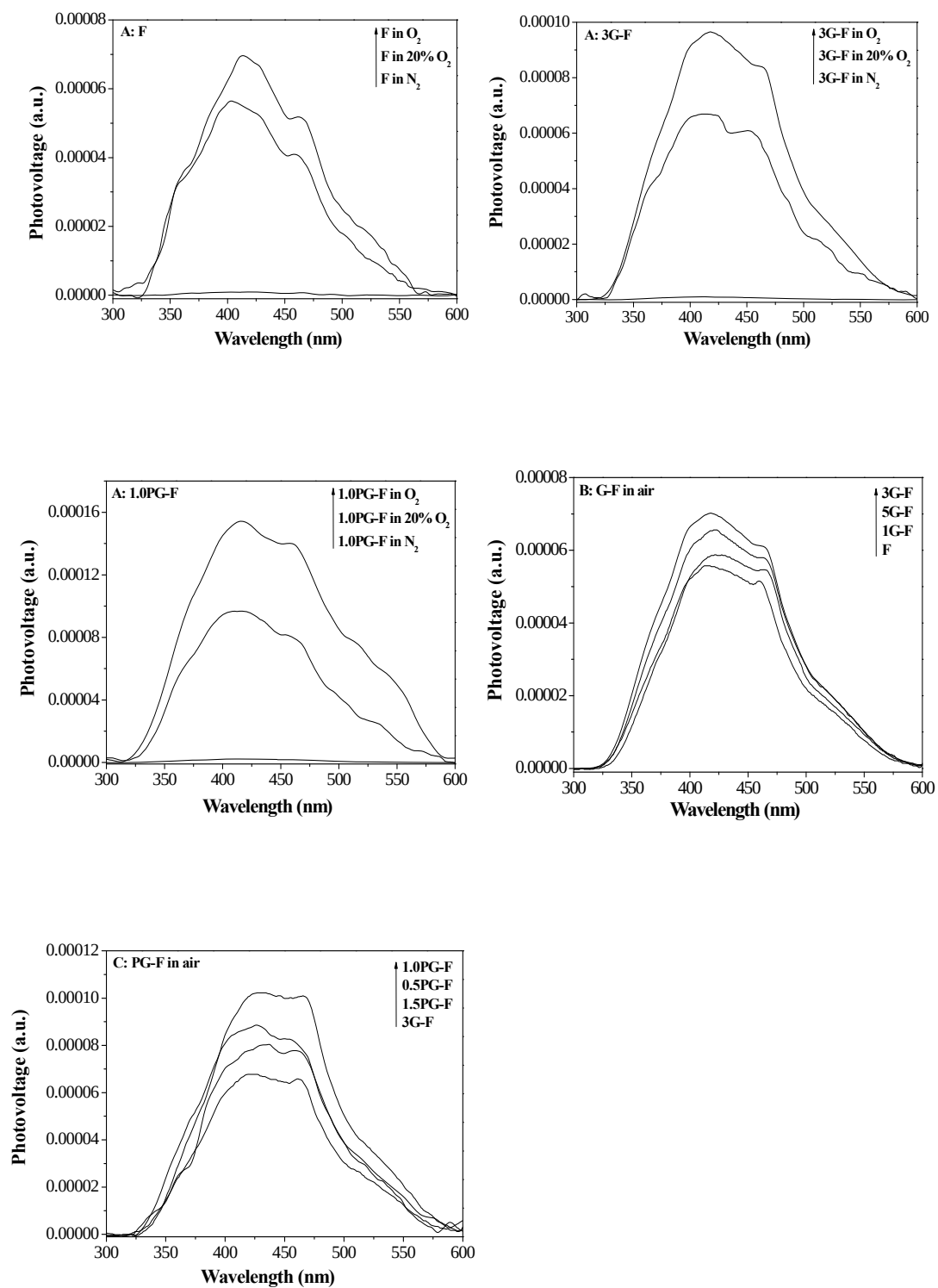
ESI-Figure 2 P2p XPS spectra of G, 0.5PG, 1.0PG and 1.5PG, in XPG X means the concentration of used phosphoric acid solution.



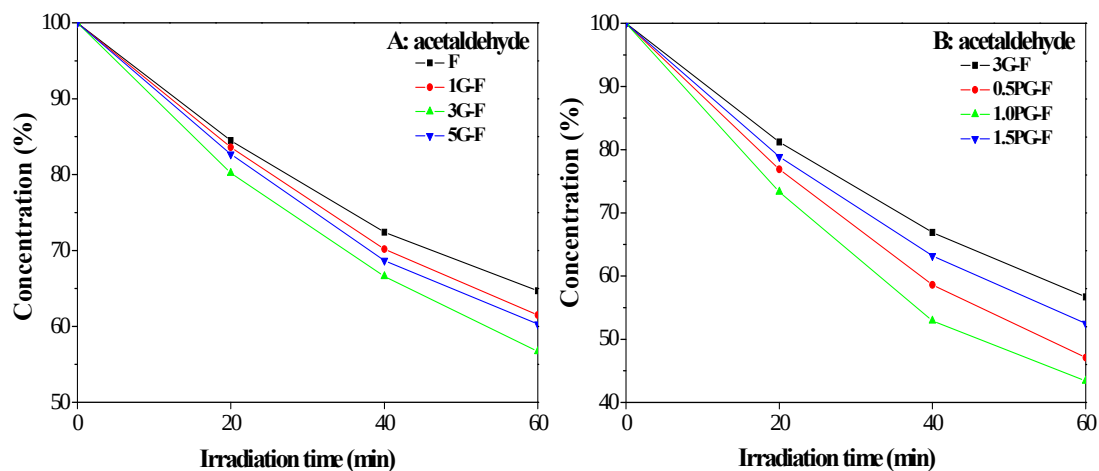
ESI-Figure 3 XRD patterns. A: F, 1G-F, 3G-F and 5G-F, in XG-F X represents the mass ratio of used G to F in the resulting composite, and B: 3G-F, 0.5PG-F, 1.0PG-F and 1.5PG-F, in XPG-F X is the concentration of used phosphoric acid solution in the 3G-F composite, and the same elsewhere unless stated.



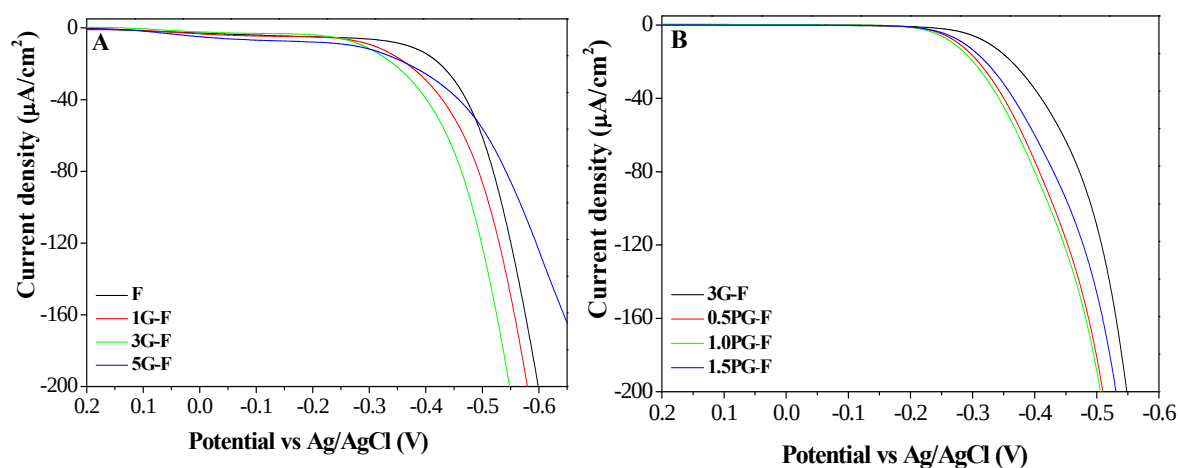
ESI-Figure 4 UV-vis DRS spectra of different samples.



ESI-Figure 5 SS-SPS responses. A: F, 3G-F and 1.0PG-F in different atmosphere, B: F, 1G-F, 3G-F, and 5G-F in air, and C: 3G-F, 0.5PG-F, 1.0PG-F and 1.5PG-F in air.



ESI-Figure 6 Photocatalytic degradation. A: gas-phase acetaldehyde on F, 1G-F, 3G-F and 5G-F, B: gas-phase acetaldehyde on 3G-F, 0.5PG-F, 1.0PG-F and 1.5PG-F. (Initial concentration of aldehyde: 810 ppm, irradiation time: 1h).



ESI-Figure 7 Electrochemical reduction of O_2 in the dark on F, 1G-F, 3G-F and 5G-F films (A) and on 3G-F, 0.5PG-F, 1.0PG-F and 1.5PG-F films (B) measured in an oxygen-bubbled 1.0M NaOH solution.