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Supporting Information

Layered Metal-Organic Framework/Graphene Hybrids for

Photocatalyzed Green Synthesis under Visible Light

Jie Xu, Sha He, Hualei Zhang, Jiancai Huang, Huaxiang Lin, Xuxu Wang, Jinlin Long*

State Key Laboratory of Photocatalysis on Energy and Environment, School of Chemistry, Fuzhou University, Fuzhou 350116, People's Republic of China

E-mail: jllong@fzu.edu.cn

URL: http://chem.fzu.edu.cn/szdw/teacherinfo.aspx?id=40

Tel: +86-591-83779121; fax: +86-591-83779121

Quantum yield (QY) calculation

The quantum yield test was performed under visible light irradiation with the corresponding band-pass filter (400 nm, 420 nm, 450 nm) to ensure the photocatalytic procedure was excited only by the narrowband light. The QY is calculated by following the equation:

 $QY = \frac{The amount of product}{The amount of photons absorbed} \times 100\%$



Figure S1 XRD patterns of NH₂-MIL-125(Ti) and rGO/NH₂-MIL-125(Ti).



Figure S2 SEM images of NH₂-MIL-125(Ti) and 1.0rGO/NH₂-MIL-125(Ti).



Figure S3 TEM and HRTEM images of NH₂-MIL-125(Ti) (A, C) and 1.0rGO/NH₂-MIL-125(Ti) (B, D).



Figure S4 ¹HNMR spectra (500 MHz, Dimethyl Sulfoxide-d6) of pyrene⁺ and pyrene⁺-GO. δ = 8.0-9.0 ppm (m, 9H, PyH) (A), δ = 5.46-5.50 ppm (s, 2H, CH₂N⁺) (B), δ = 3.4-3.45 ppm (s, 9H, (CH₃)₃N⁺) (C).



Figure S5 XRD patterns of as-prepared samples.



Figure S6 SEM images for UiO-66-NH₂ (A), UiO-66-NH₂ synthesized with double amount of ligand (UiO-66-NH₂-DL) (B), $1.0rGO/UiO-66-NH_2$ synthesized without pyrene⁺ ($1.0rGO/UiO-66-NH_2-NP$)(C), $1.0rGO/UiO-66-NH_2$ synthesized with the formal amount of ligand ($1.0rGO/UiO-66-NH_2-SL$)(D).



Figure S7 FTIR spectra of UiO-66-NH₂ and 1.0GO/UiO-66-NH₂.



Figure S8 Raman spectra of GO and $rGO/UiO-66-NH_2$ with different graphene contents.



Figure S9 Photocatalytic activity of 1.0rGO/UiO-66-NH $_2$ hybrids prepared by different methods.



Figure S10 UV-vis absorption spectra of as-prepared pyrene⁺ in H₂O.



Figure S11 FTIR spectra of 1-bromoacethyl pyrene and pyrene⁺.



Figure S12 Thermal analysis of UiO-66-NH₂ and 1.0rGO/UiO-66-NH₂