

Supporting information

DNA damage caused by light-driven graphene oxide: A new mechanism

Xujun Wang^a, Zihang Zeng^a, Tianhui Yang^a, Peng Zhang^a, Bo Feng^a, Taiping Qing^{a}*

^aCollege of Environment and Resources, Xiangtan University, Xiangtan 411105,
Hunan, China

*To whom correspondence should be addressed: Tel: 86-731-58298259; E-mail:
taiping_qing@163.com (T Qing).

Table S1 The sequences and modifications of the DNAs used in this work.

Name	Sequences and modifications(5'to 3')
A ₁₄ -FAM	AAA AAA AAA AAA AA-FAM
A ₂₄ -FAM	AAA AAA AAA AAA AAA AAA AAA AAA-FAM
A ₄₄ -FAM	AA AA-FAM
T ₁₄ -FAM	TTTTTTTTTTTTTT-FAM
T ₂₄ -FAM	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTT-FAM
T ₄₄ -FAM	TT-FAM
C ₁₄ -FAM	CCCCCCCCCCCCC-FAM
C ₂₄ -FAM	CCCCCCCCCCCCCCCCCCCCCCCCC-FAM
C ₄₄ -FAM	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC- FAM
R ₁₄ -FAM	GCTATCGTACTGAT-FAM
R ₂₄ -FAM	AGTTGGCTGAAGCGTTCATGCAGT-FAM
R ₄₄ -FAM	GTACTGATAGTTGATGCAGACTAGTTGCTGACCTAGAGTACGTC- FAM
G ₁₄ -FAM	GGGGGGGGGGGGG-FAM
A ₁₄ -FQ	FAM-AAAAAAAAAAAAAAAA-BHQ
R ₄₄	GTACTGATAGTTGATGCAGACTAGTTGCTGACCTAGAGTACGTC
cR ₄₄	GACGTA CTAGGTCAGCAACTAGTCTGCATCAACTATCAGTAC

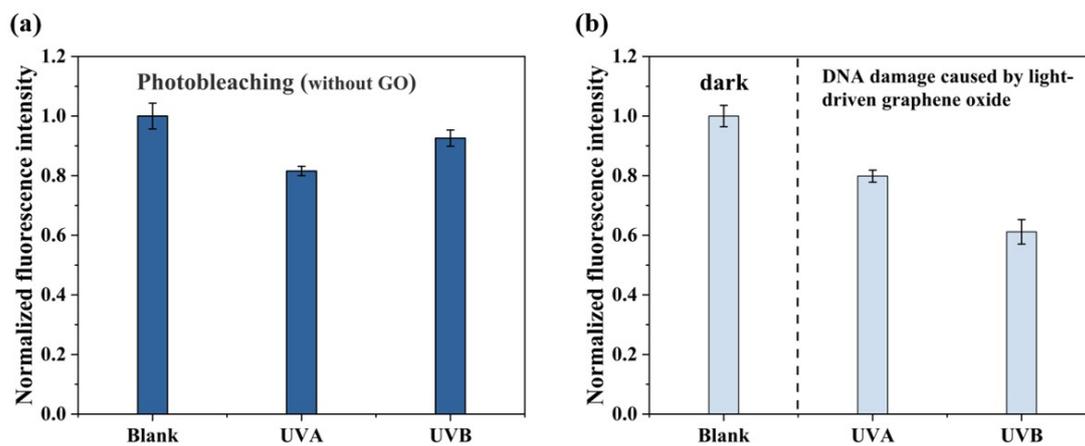


Figure S1. (a) Normalized fluorescence intensity of the R₁₄-FAM (0.5 μM) after 3 hours of UV irradiation (UVA: 0.71 W/m², 340 nm; UVB: 0.5 W/m², 313 nm). (b) Normalized fluorescence intensity of the R₁₄-FAM (0.5 μM) in the presence of graphene oxide (0.01 mg/mL) with different reaction conditions (dark 3h or UV irradiation for 3h).

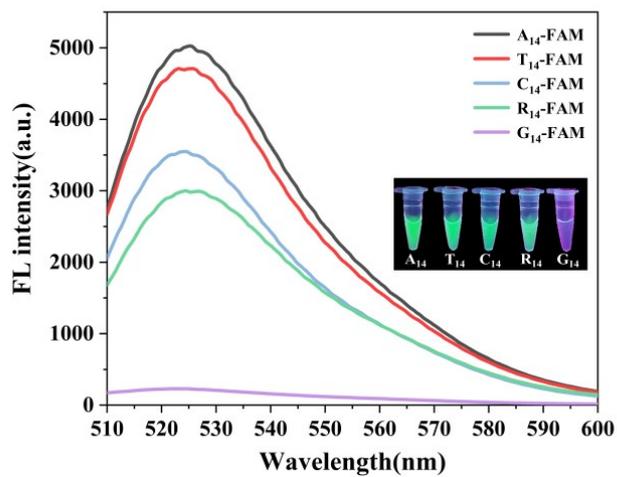


Figure S2. Fluorescence spectra of the FAM-labeled DNA (A₁₄, T₁₄, C₁₄, R₁₄, G₁₄), the concentration of all DNA was 0.5 μ M.

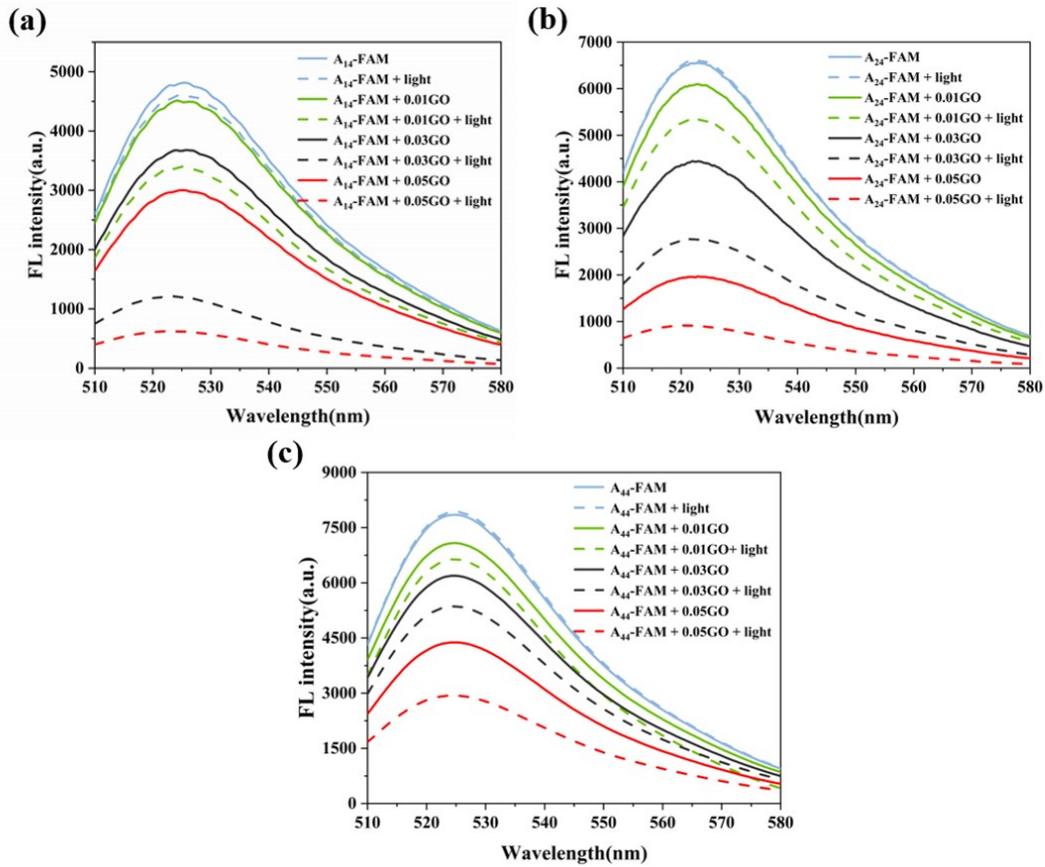


Figure S3. Fluorescence intensity of the FAM-labeled DNA (a) A_{14} , (b) A_{24} , (c) A_{44} ($0.5 \mu\text{M}$ each) in the presence of GO (0.01, 0.03, 0.05 mg/mL) with different reaction conditions (dark 3h or UV irradiation for 3h).

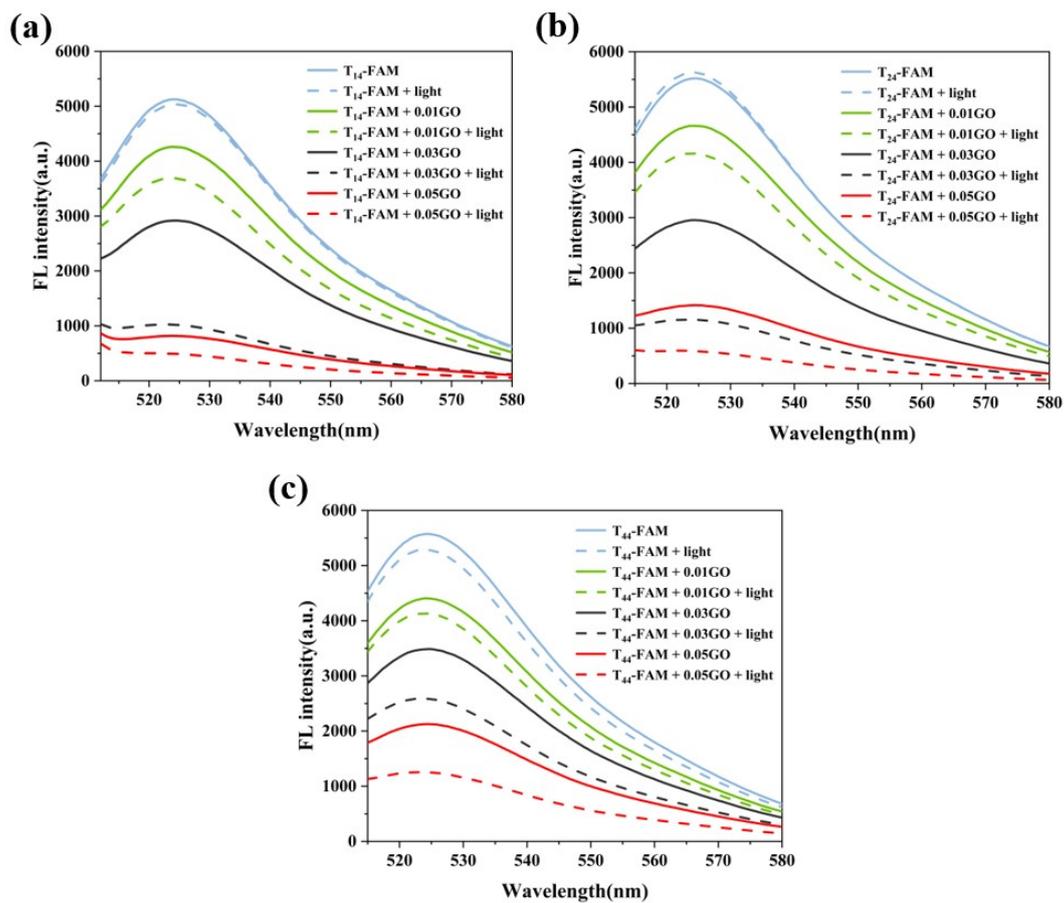


Figure S4. Fluorescence intensity of the FAM-labeled DNA (a) T₁₄, (b) T₂₄, (c) T₄₄ (0.5 μM each) in the presence of GO (0.01, 0.03, 0.05 mg/mL) with different reaction conditions (dark 3h or UV irradiation for 3h).

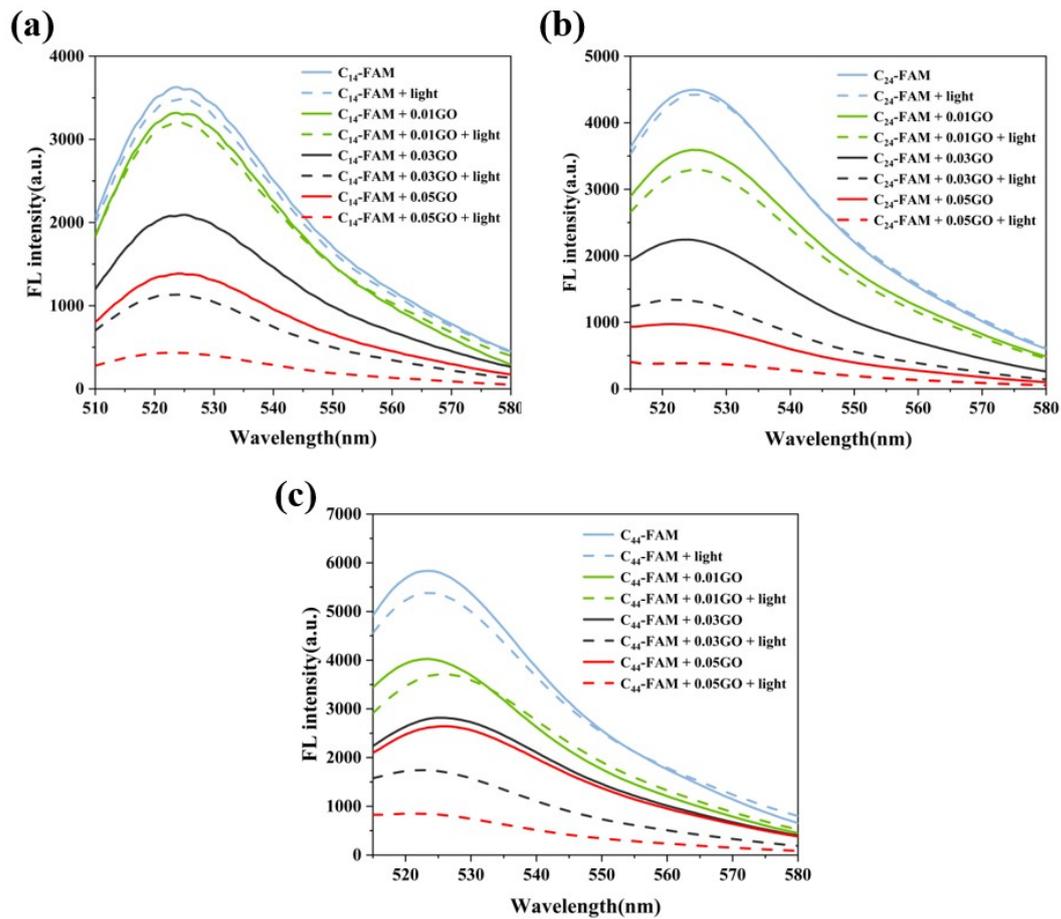


Figure S5. Fluorescence intensity of the FAM-labeled DNA (a) C₁₄, (b) C₂₄, (c) C₄₄ (0.5 μM each) in the presence of GO (0.01, 0.03, 0.05 mg/mL) with different reaction conditions (dark 3h or UV irradiation for 3h).

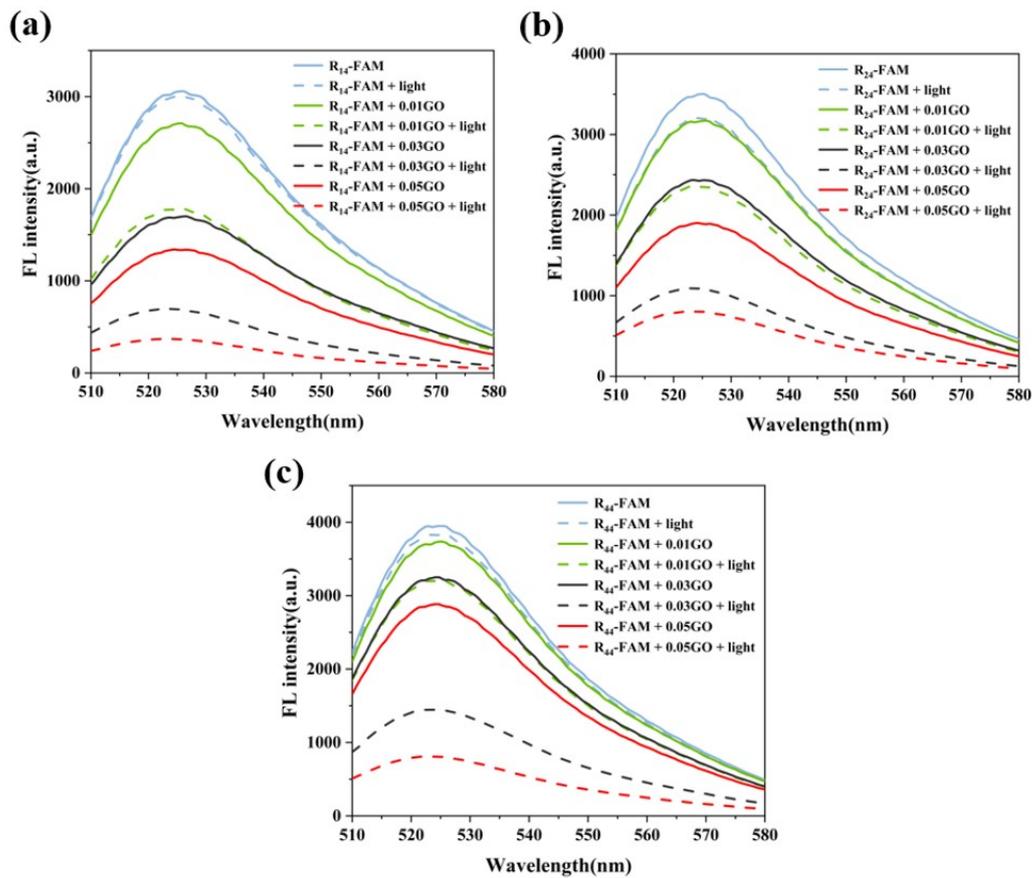


Figure S6. Fluorescence intensity of the FAM-labeled DNA (a) R_{14} , (b) R_{24} , (c) R_{44} DNA ($0.5 \mu\text{M}$ each) in the presence of GO (0.01, 0.03, 0.05 mg/mL) with different reaction conditions (dark 3h or UV irradiation for 3h).

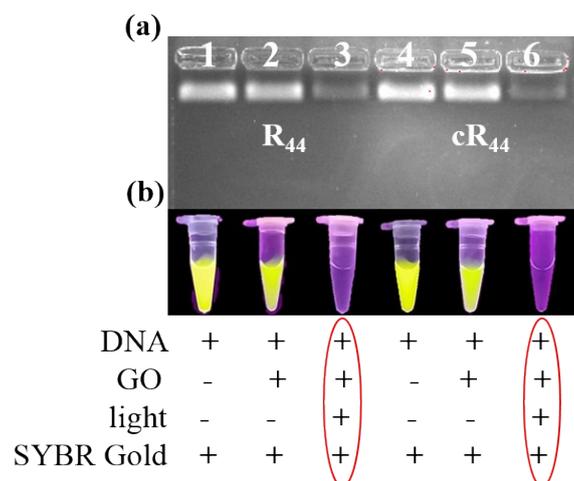


Figure S7. (a) Gel-electrophoresis image of the GO/DNA under different conditions. (b) The corresponding pictures processed for each experiment were taken under the UV excitation. The concentrations of GO and DNA were 0.01 mg/mL and 0.5 μ M, respectively.

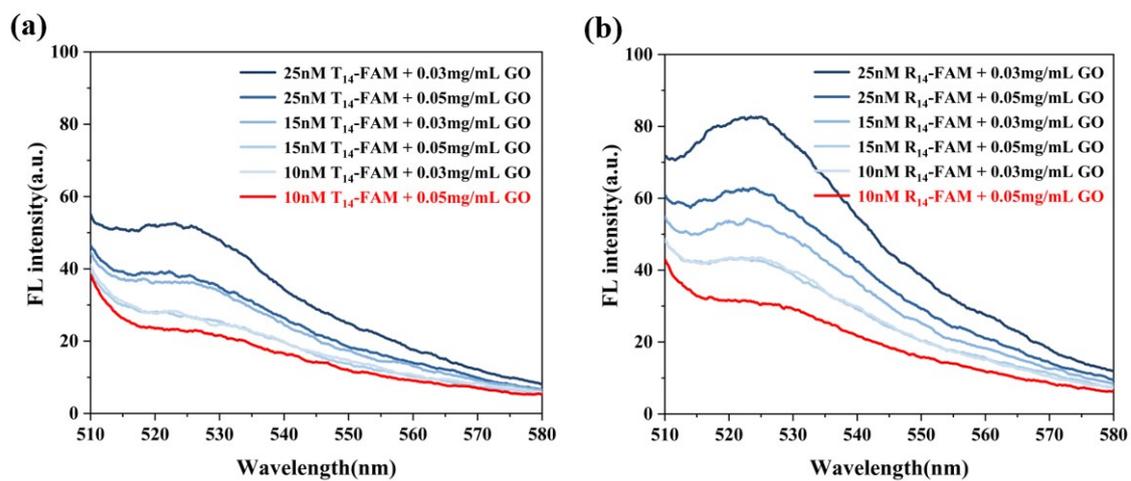


Figure S8. Fluorescence intensity of different concentrations of (a) T₁₄-FAM, (b) R₁₄-FAM after reacting with GO (0.03, 0.05 mg/mL) in the dark for 3 hours.