**Supporting Information**

# Recyclable, Bifunctional Composites of Perovskite Type N-$CaTiO_3$ and Reduced Graphene Oxide as an Efficient Adsorptive Photocatalyst for Environmental Remediation

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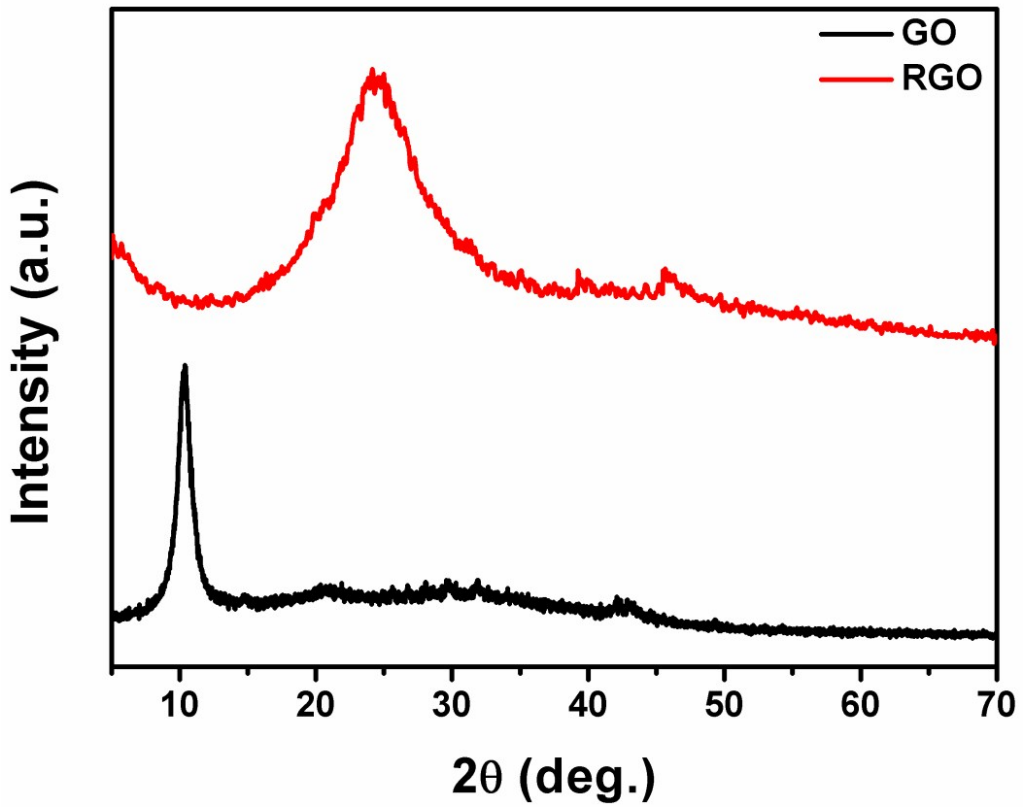



**Figure S1.** XRD pattern of GO and RGO

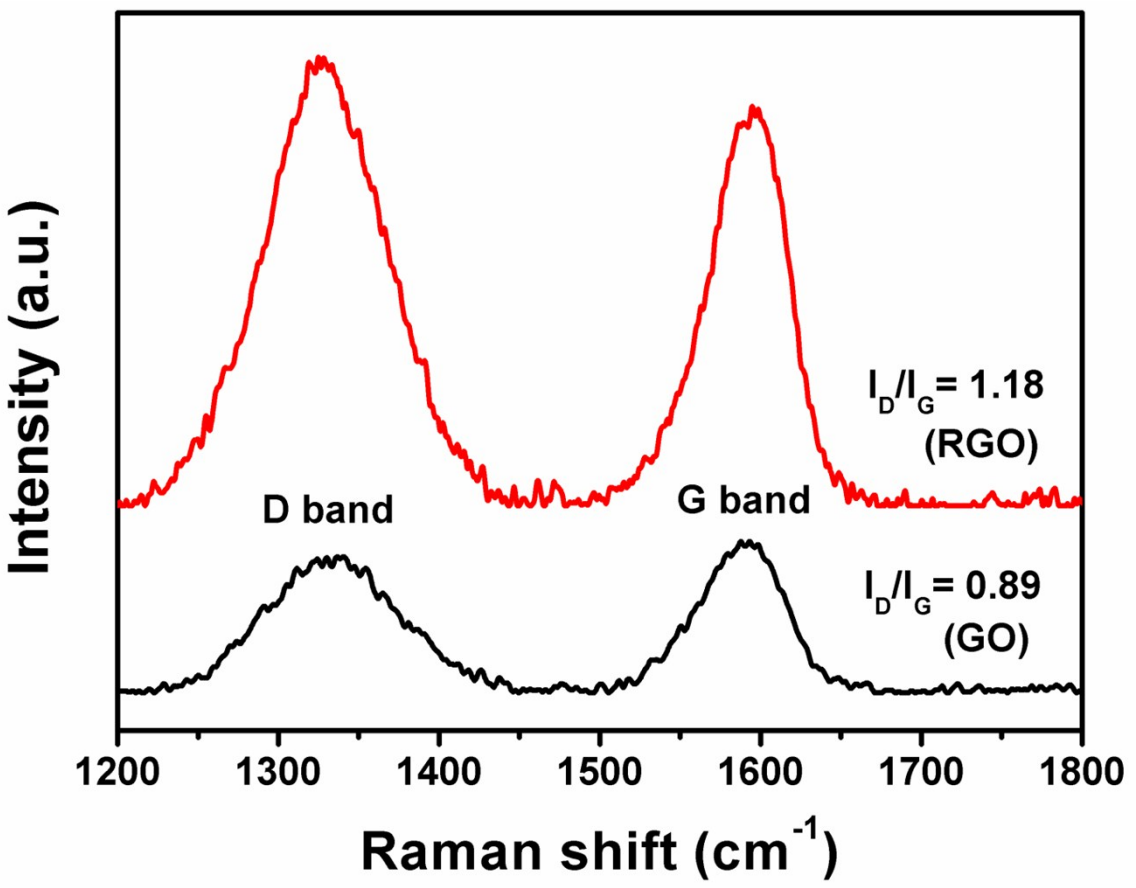



**Figure S2.** Raman spectra of GO and RGO

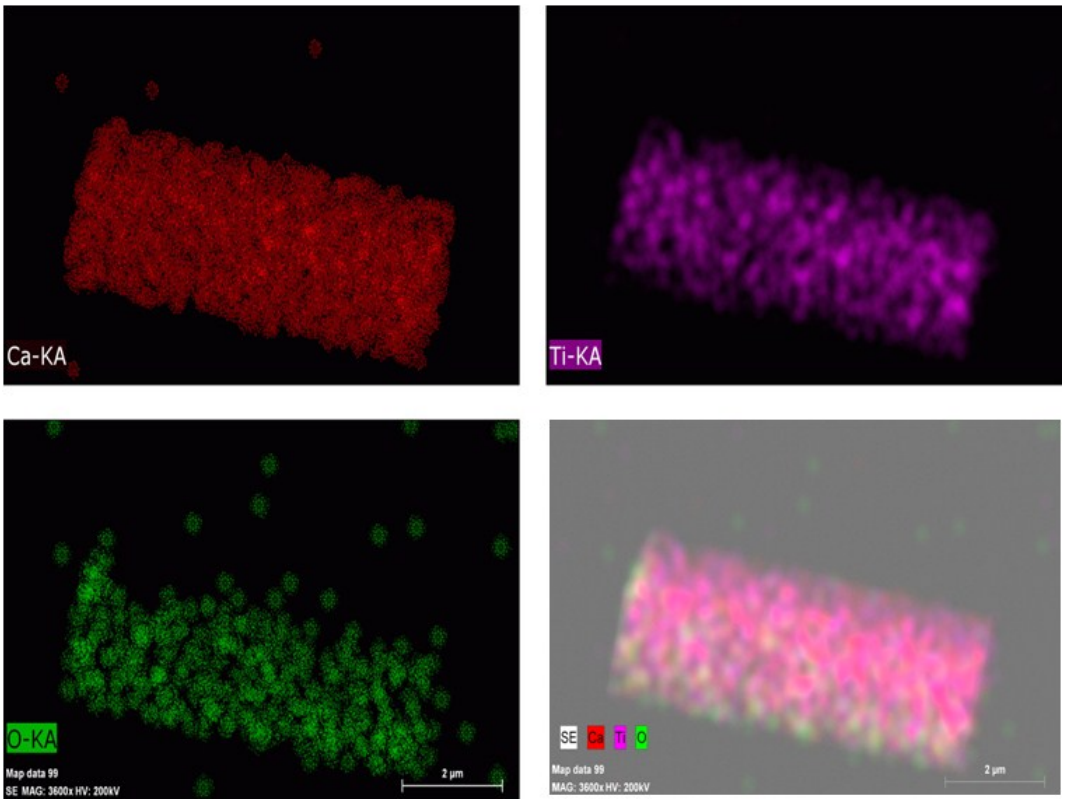



**Figure S3.** Elemental mapping of CT.

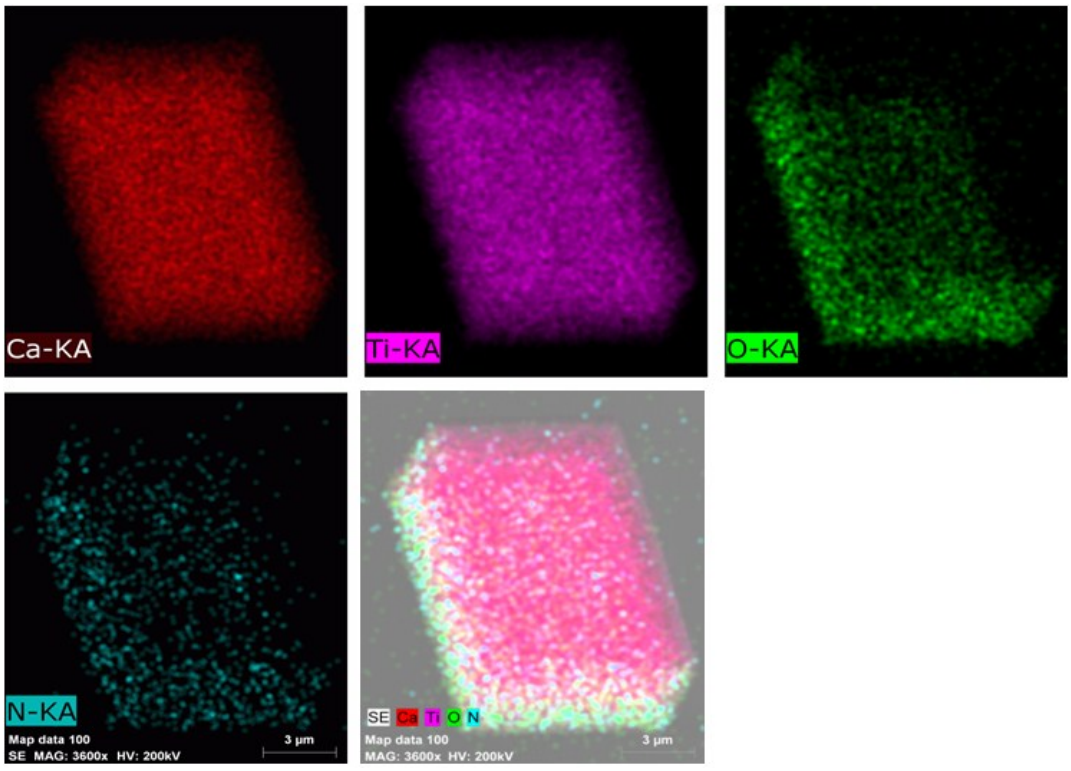



**Figure S4.** Elemental mapping of NCT.

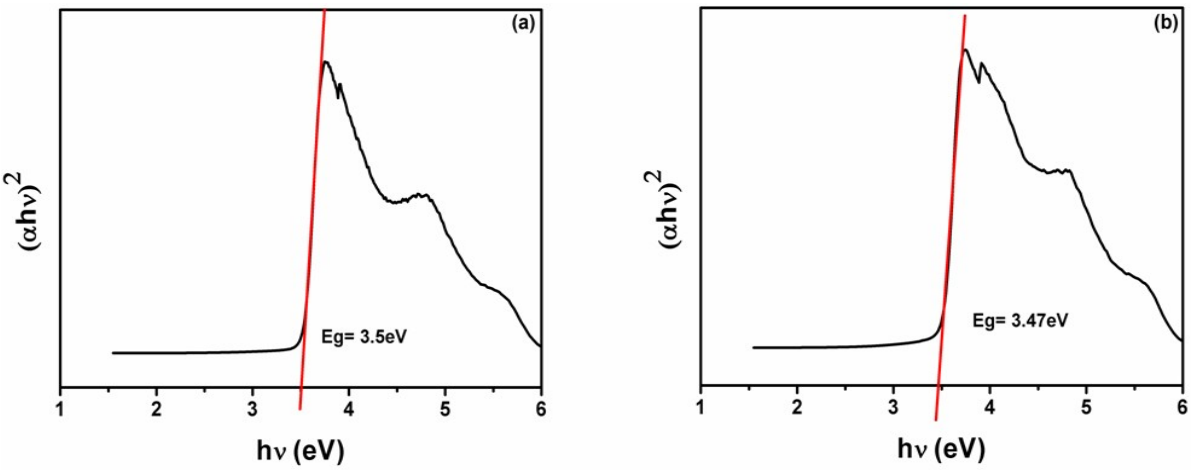



**Figure S5.** Plot of transformed Kubelka-Munk function vs the energy of light: (a) CT (b) NCT

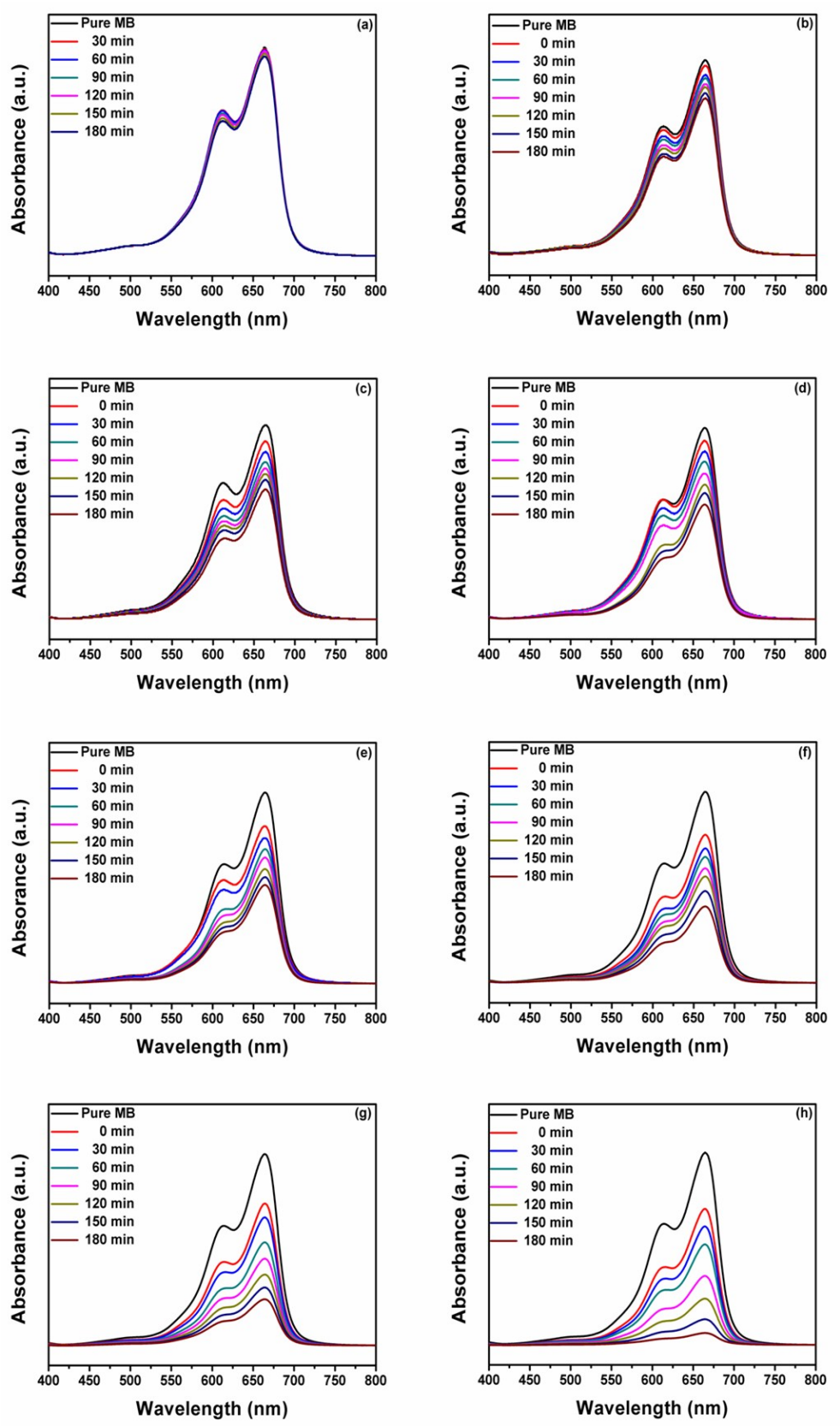



**Figure S6.** Time dependent absorption spectra of MB degradation: (a) Pure MB (b) CT (c) NCT (d) NCTG01 (e) NCTG03 (f) NCTG05 (g) NCTG10 and (h) NCTG20.

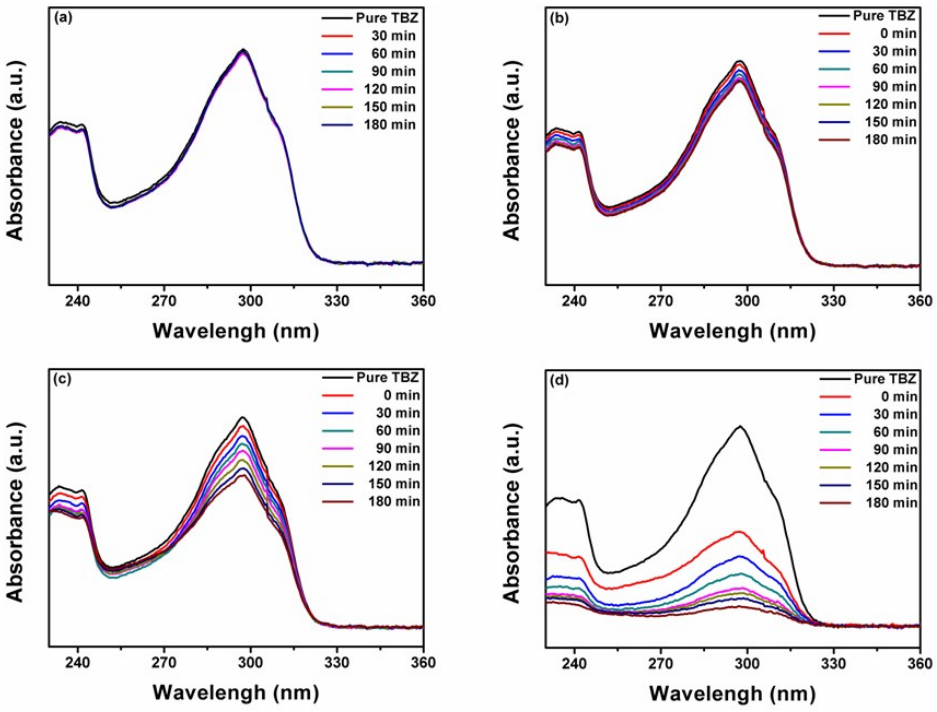



**Figure S7.** Time dependent absorption spectra of TBZ degradation: (a) Pure TBZ (b) CT (c) NCT and (d) NCTG20.

**Table S1.** Summary of kinetic data of photocatalytic degradation of MB using all prepared photocatalysts under visible light irradiation

| Sl. No. | Photocatalyst | Rate constant *k* ($min^{-1}$) | $t_{1/2}$ (min) | $R^2$ |
|---|---|---|---|---|
| 1 | Bare MB | 0.0002 | 2898.14 | 0.9300 |
| 2 | CT | 0.0009 | 766.34 | 0.9719 |
| 3 | NCT | 0.0016 | 420.00 | 0.9899 |
| 4 | NCTG01 | 0.0022 | 308.00 | 0.9805 |
| 5 | NCTG03 | 0.0028 | 250.18 | 0.9954 |
| 6 | NCTG05 | 0.0036 | 194.66 | 0.9808 |
| 7 | NCTG10 | 0.0061 | 114.36 | 0.9896 |
| 8 | NCTG20 | 0.0112 | 61.88 | 0.8838 |

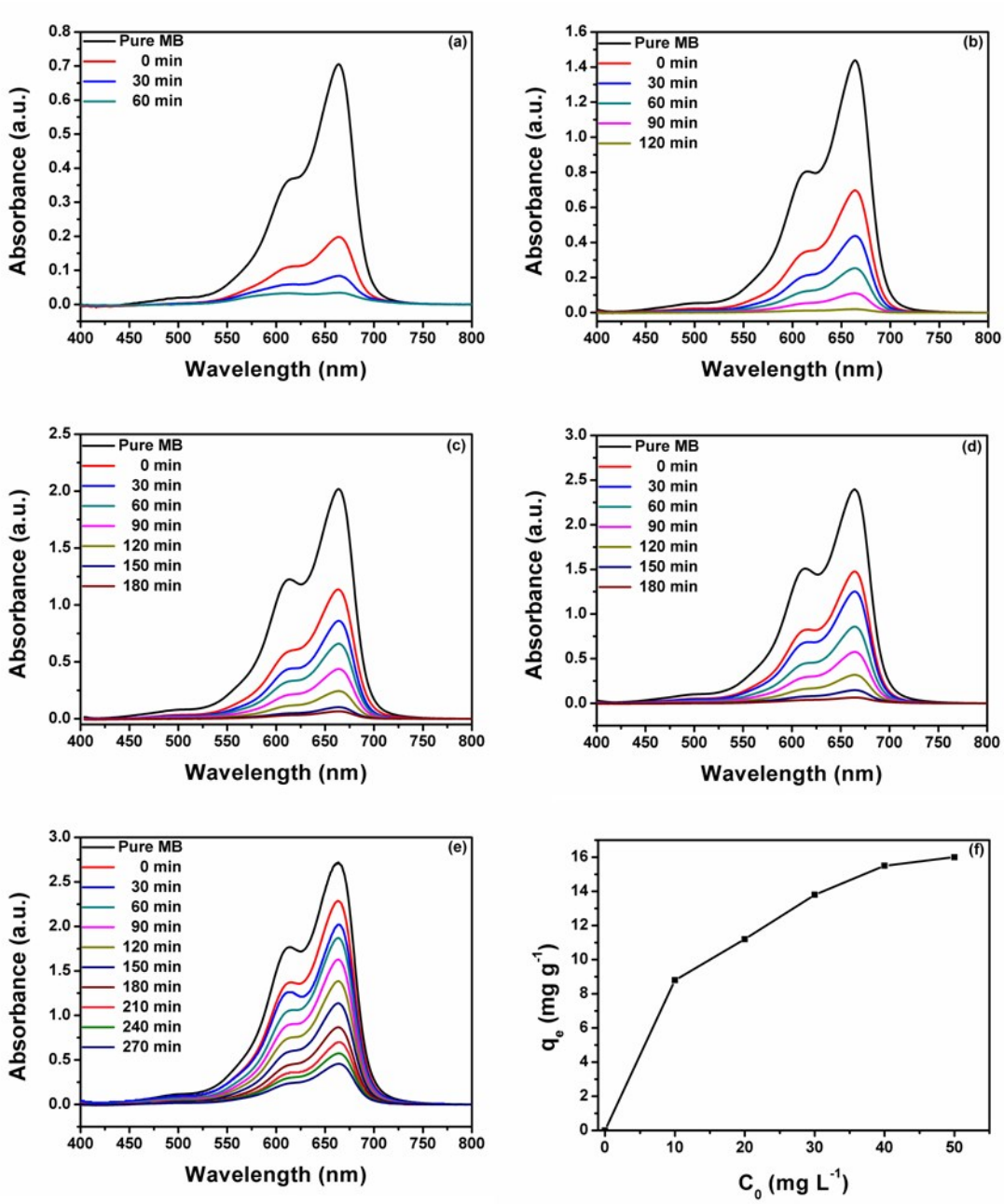



**Figure S8.** Adsorption/degradation by NCTG20 composite: (a) 1 × $10^{-5}$ M (b) 2 × $10^{-5}$ M (c) 3 × $10^{-5}$ M (d) 4 × $10^{-5}$ M (e) 5 × $10^{-5}$ M MB and (f) dye adsorption isotherm of MB on NCTG20 composite.

**Table S2.** Summary of adsorption parameters

| **Langmuir model** | | | **Freundlich model** | | |
|---|---|---|---|---|---|
| $q_m$ | $K_L$ | $R^2$ | $K_f$ | 1/n | $R^2$ |
| 16.37 | 0.00631 | 0.985 | 8.234 | 0.1842 | 0.936 |

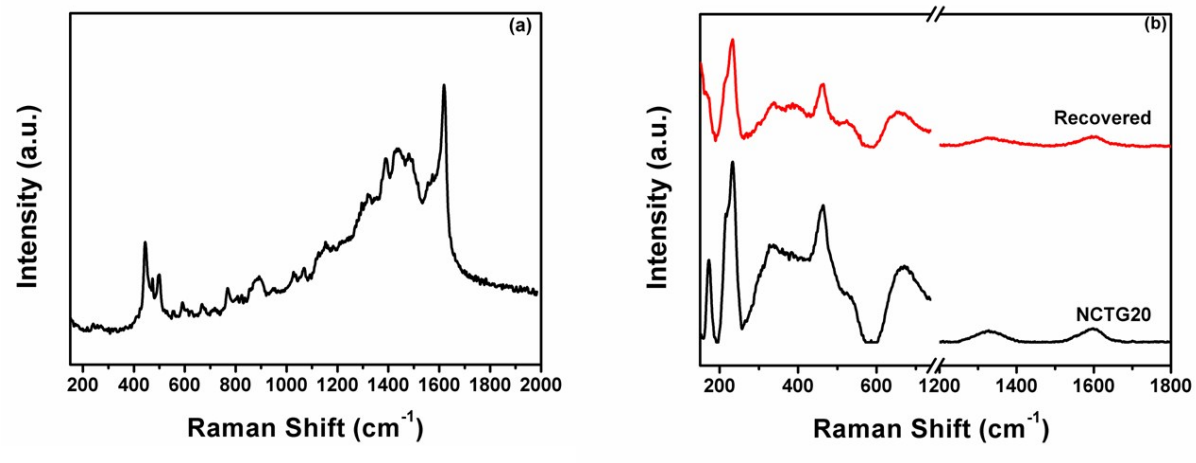
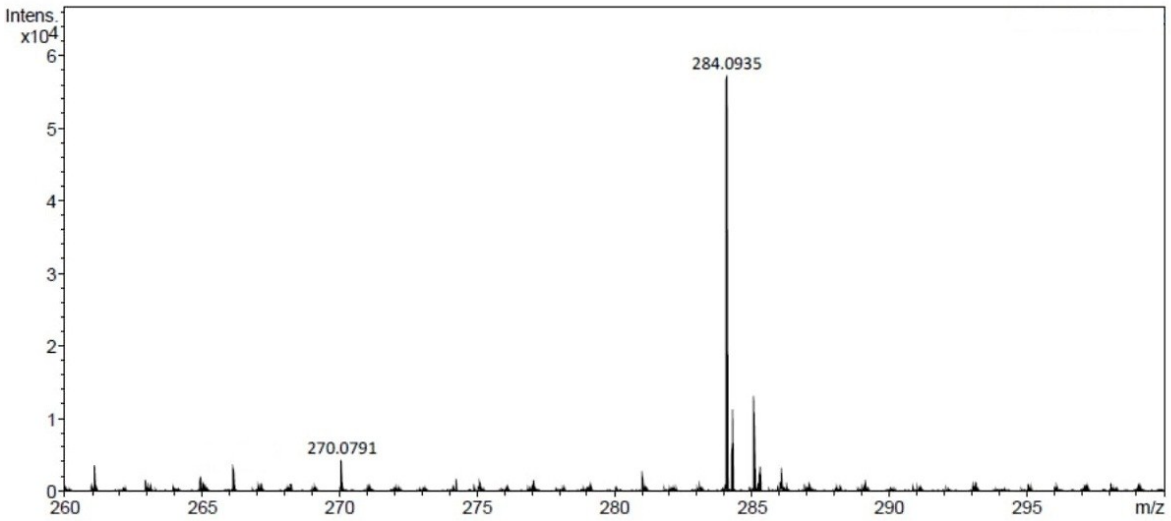



**Figure S9.** Raman spectra of MB[1] and recovered catalyst after third cycle


Intens.
x10^4
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5
4
3
2
1
0
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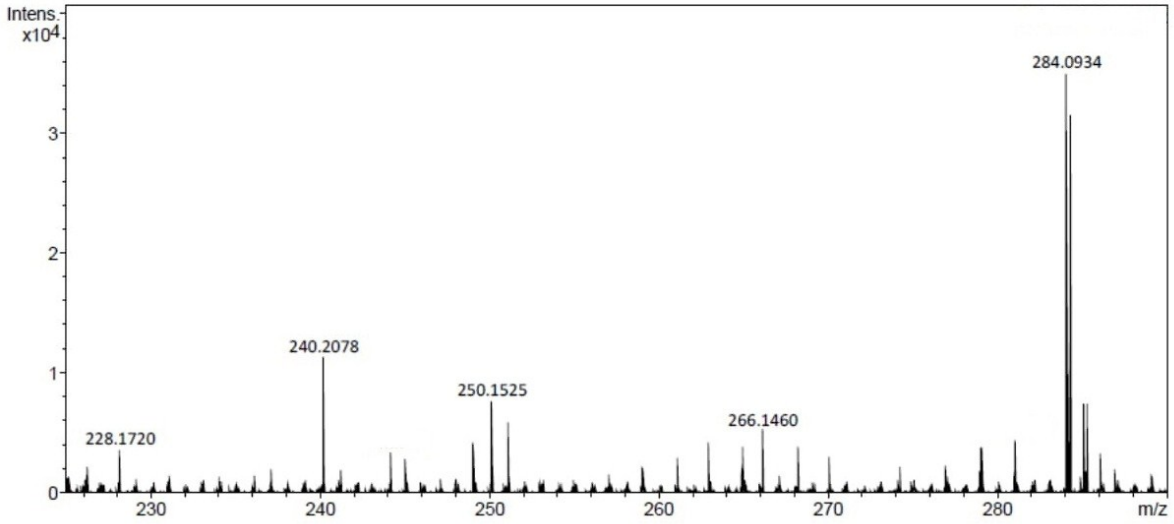
270.0791
260
265
270
275
280
285
290
295
m/z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230
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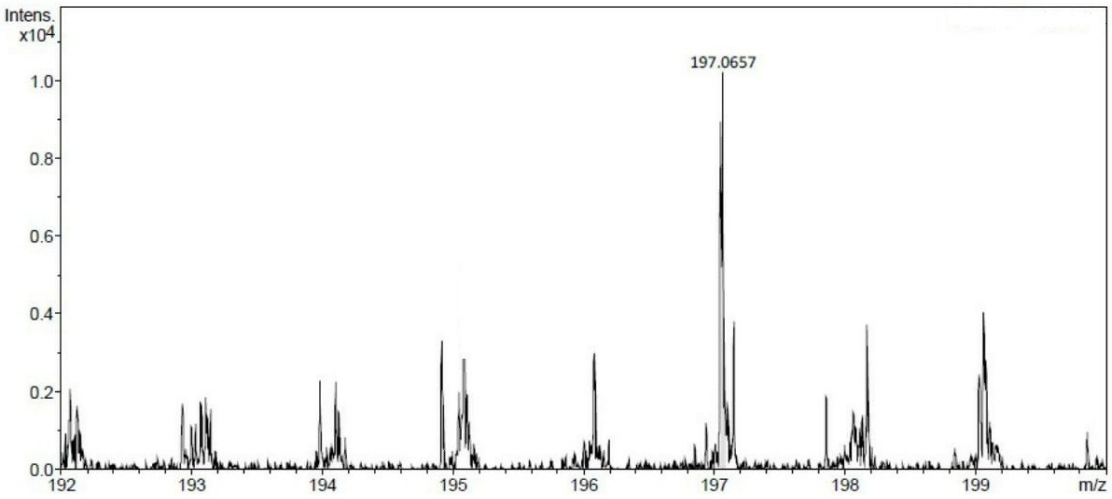
250
260
270
280
m/z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0.0
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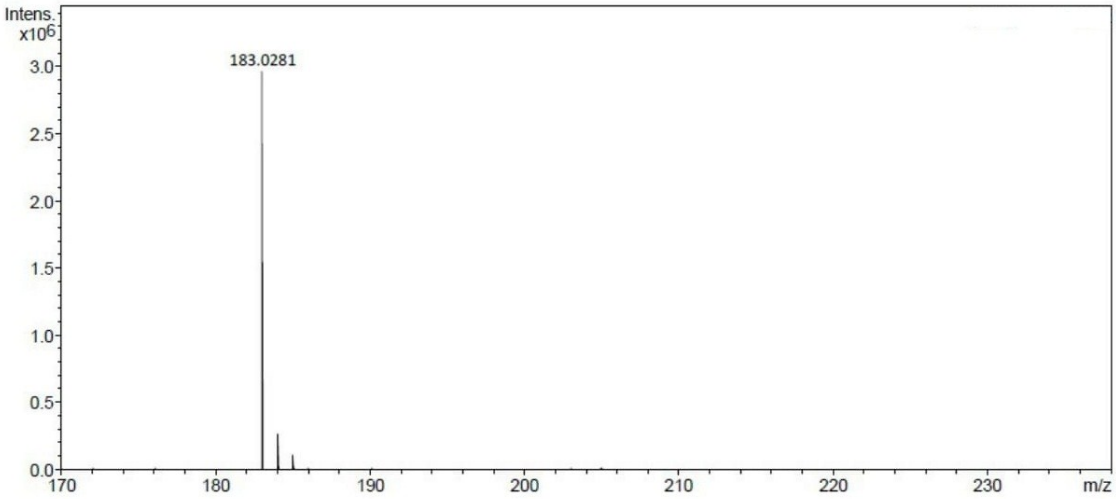
193
194
195
196
197
198
199
m/z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180
190
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220
230
m/z

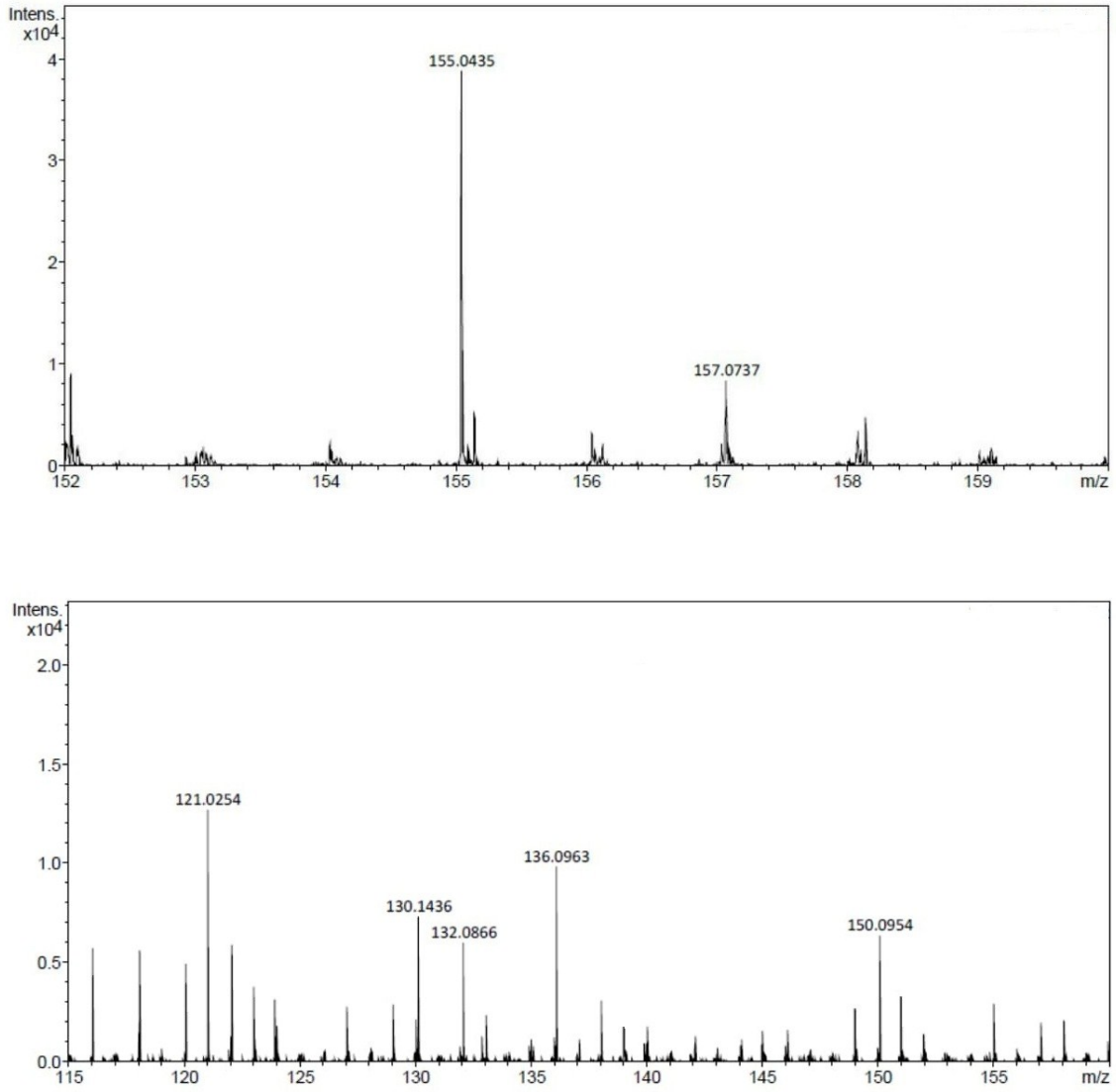


**Figure S10.** Mass spectra of degraded MB solution by NCTG20 composite under visible light

## References

1. D. Volpati, P. H. Aoki, C. A. Dantas, F. V. Paulovich, M. C. F. de Oliveira, O. N. Oliveira Jr, A. Riul Jr, R. F. Aroca and C. J. Constantino, *Langmuir*, 2011, 28, 1029-1040.