**Supplementary Information:**

**Effect of GO additive in ZnO/rGO nanocomposites with enhanced photosensitivity and photocatalytic activity**

Chatchai Rodwihok¹, Duangmanee Wongratanaphisan², Yen Linh Thi Ngo¹, MahimaKhandelwal¹, Seung Hyun Hur¹ and Jin Suk Chung¹,*

¹School of Chemical Engineering, University of Ulsan, Daehak-ro 93, Nam-gu, Ulsan 680-749, Republic of Korea; c.r wdwhok@hotmail.com (C.R.); nguyenlinh0912@gmail.com (Y.L.T.N.); mahimaiitr@gmail.com (M.K.); shhur@ulsan.ac.kr (S.H.H.)

²Department of Physics and Materials Science, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand; duangmanee.wong@cmu.ac.th (D.W.)

*Correspondence: jschung@ulsan.ac.kr (J.S.C.)

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**Figure S2.** Time-dependent absorption spectra of Methyl blue (MB) solution under visible light using (a) ZnO, (b) ZnO/rGO (10%), (c) ZnO/rGO (20%), and ZnO/rGO (30%) as a photocatalyst.

**Figure S3.** The photoluminescence spectra of pristine ZnO and as-synthesized ZnO/rGO
### Table S1 Comparisons of photosensitivity and time-dependent photocurrent response between the present work and other reported UV detectors.

| Structure                     | Substrate     | $\lambda_{UV}$ (nm) | UV intensity (W/cm$^2$) | Bias voltage (V) | Dark current (A) | Photosensitivity ($I_{UV}/I_{DARK}$) | Response time (s) | Ref.   |
|-------------------------------|---------------|---------------------|------------------------|------------------|------------------|--------------------------------------|-------------------|--------|
| MgZnO/ZnO thin film           | Glass         | 365                 | $3.20 \times 10^{-3}$  | 4                | $~4.64 \times 10^{-6}$ | $~1.01$ | -                  | [1] |
| ZnO nanowires                 | SiO$_2$/Si    | 325                 | $0.42 \times 10^{-3}$  | 1.5              | $~0.50 \times 10^{-6}$ | $<4$ | -                  | [2] |
| ZnO nanowires                 | SiO$_2$/Si    | 300                 | $2 \times 10^{-3}$     | 0.1              | $~12.70 \times 10^{-6}$ | $~1.51$ | 0.2                | [3] |
| ZnO nanostructures            | p-Si          | 365                 | 0.80                   | 3                | $~3.50 \times 10^{-6}$ | $~1.71$ | -                  | [4] |
| Ti-doped ZnO thin film        | glass         | $\sim 365$         | $2 \times 10^{-3}$     | 5                | $~15.00 \times 10^{-9}$ | $~6.80$ | 135                | [5] |
| ZnO/rGO nanostructures        | glass         | 365                 | $0.80 \times 10^{-3}$  | 2                | $~7.00 \times 10^{-6}$ | 4 | 44                 | [6] |
| ZnO/rGO nanostructures        | glass         | 368                 | $0.80 \times 10^{-3}$  | 4                | -                | 20.10            | -                  | [7] |
| ZnO/rGO (20%)                 | transparent film | 365             | $0.62 \times 10^{-3}$  | 2                | $3.98 \times 10^{-9}$ | 8.81 | 18.16              | This work |

### Table S2 Comparisons of photocatalytic activity between the present work and other reported research.

| Catalyst                      | Catalyst concentration (g L$^{-1}$) | Light source              | MB concentration (mg L$^{-1}$) | Degradation rate (%) and time (min) | $k_c$ (min$^{-1}$) | Ref. |
|-------------------------------|--------------------------------------|---------------------------|-------------------------------|-------------------------------------|-------------------|------|
| ZnO/GO (3%)                   | 0.4                                  | Metal halide lamp         | 10                            | $\sim 92\% / 30$                    | 0.042             | [8]  |
| ZnO-g-C$_3$N$_4$/GO (50%)     | 0.3                                  | Visible light             | 10                            | $99\% / 90$                        | 0.030             | [9]  |
| GO/ZnO (1:2)                  | 0.4                                  | UV light (254 nm)         | 5                             | $94.5\% / 60$                      | -                 | [10] |
| ZnO/rGO (2.5%)                | 0.5                                  | Mercury lamp (310-400 nm) | 10                            | $\sim 80\% / 120$                  | 0.012             | [11] |
| ZnO NPs/rGO                   | 0.3                                  | Hg lamp (365 nm)          | 10                            | $99.5\% / 180$                     | -                 | [12] |
| ZnO/rGO                       | 0.1                                  | Mercury lamp (365-366 nm) | 10                            | $83\% / 10$                       | -                 | [13] |
| ZnO/rGO                       | 0.15                                 | Hg lamp (365 nm)          | 5                             | $88\% / 260$                      | -                 | [14] |
| ZnO/rGO (1.5%)                | 0.2                                  | Natural sunlight          | 5                             | $82.3\% /$ -                       | -                 | [15] |
| ZnO/g-C$_3$N$_4$ (500 °C)     | 0.2                                  | 4 - Visible-light lamps (545 nm) | 10 | $\sim 99\% / 180$ | $\sim 0.033$ | [16] |
| ZnO/rGO (20%)                 | 0.2                                  | Fluorescent lamp          | 10                            | $93.78\% / 60$                     | 0.0482            | This work |
Figure S1. Current of as-synthesized ZnO/rGO with bending radius; (a) ZnO, (b) ZnO/rGO (10%), (c) ZnO/rGO (20%), and (d) ZnO/rGO (30%).
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