

Supporting information

for

Photolithographic p–n patterning of single-walled carbon nanotube sheets using photobase generators

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Table of Contents

- **Supplementary Figures (Supplementary Figs. S1–S11)**
- **Supplementary Table (Supplementary Table S1)**

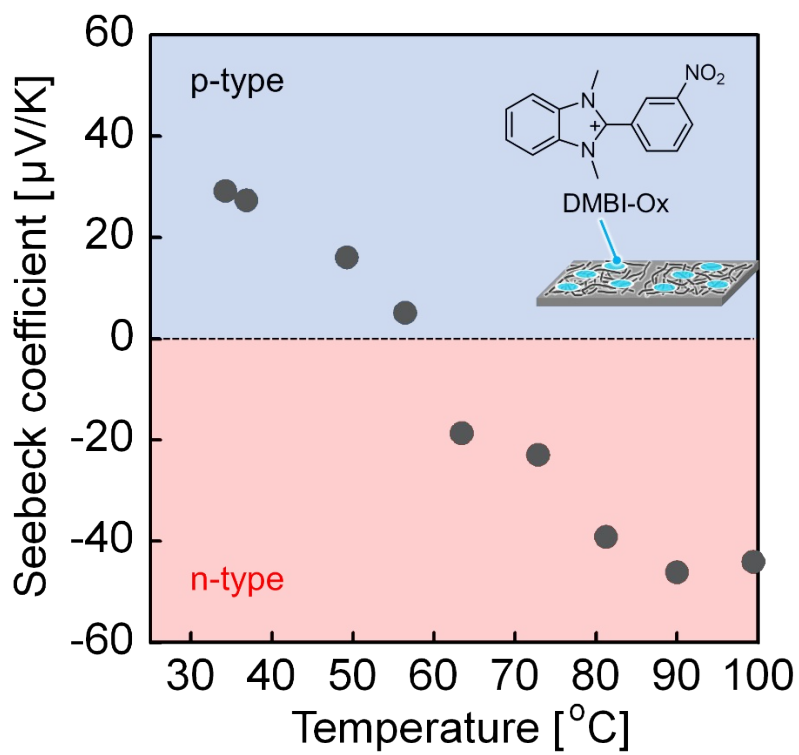


Fig. S1. Temperature dependence of Seebeck coefficient for DMBI-Ox-doped SWCNT sheet.

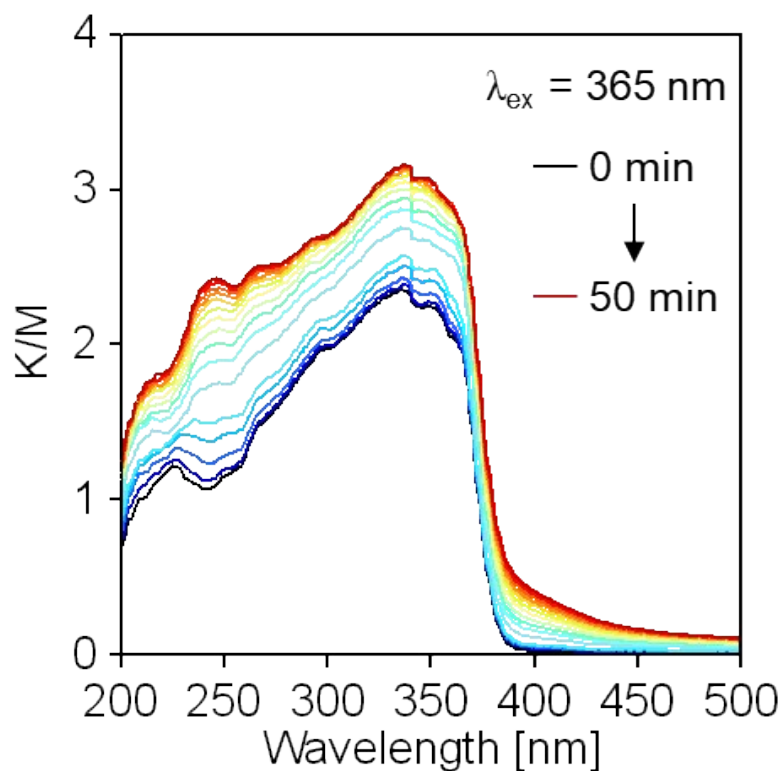


Fig. S2. Diffuse reflectance spectra of PBG1 upon UV irradiation. The Kubelka-munk function (KM) was calculated based on the kubelka-munk equation ($KM = (1-R)^2/2R$), where R is the relative reflectance of samples using barium sulfate as a standard sample by an integration sphere instrument.

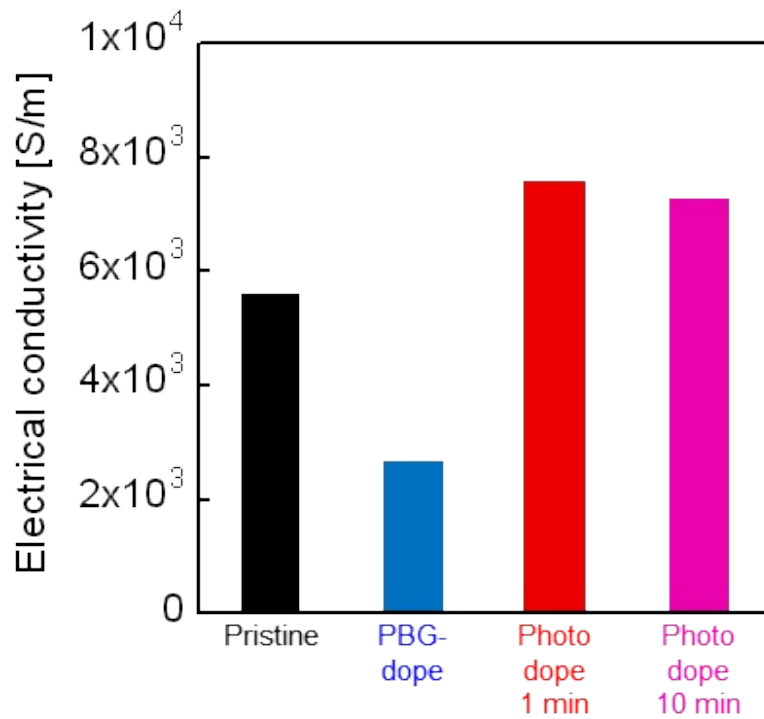


Fig. S3. Irradiation time dependency of electrical conductivity of the SWCNT sheets dipped in the 30 mM PBG1 solution.

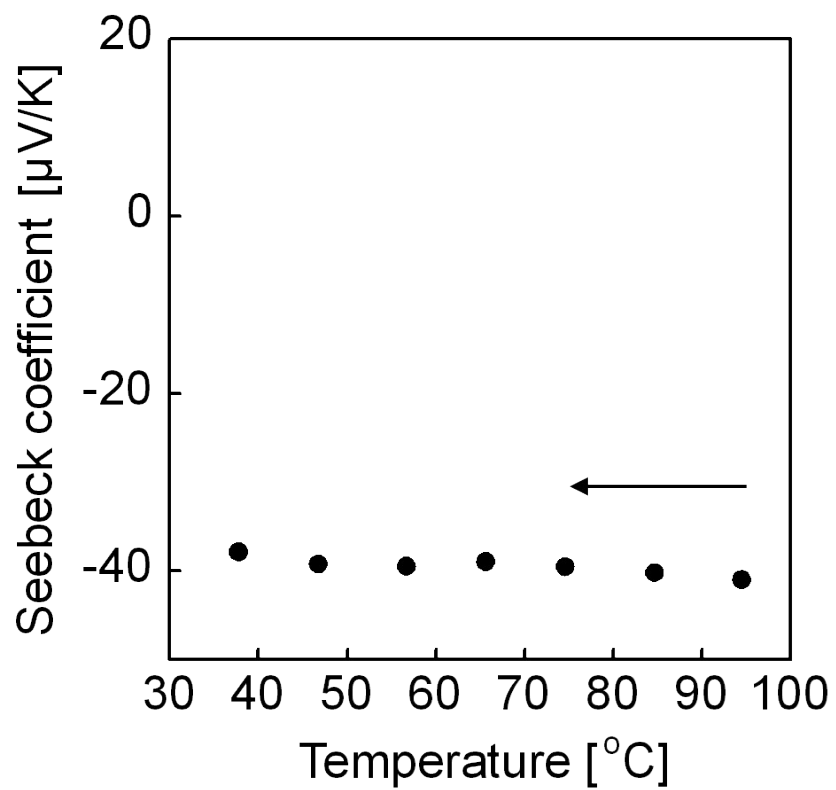


Fig. S4. Temperature dependence of Seebeck coefficient for PBG1-doped SWCNT sheets in a helium atmosphere upon cooling from 100 °C to 30 °C.

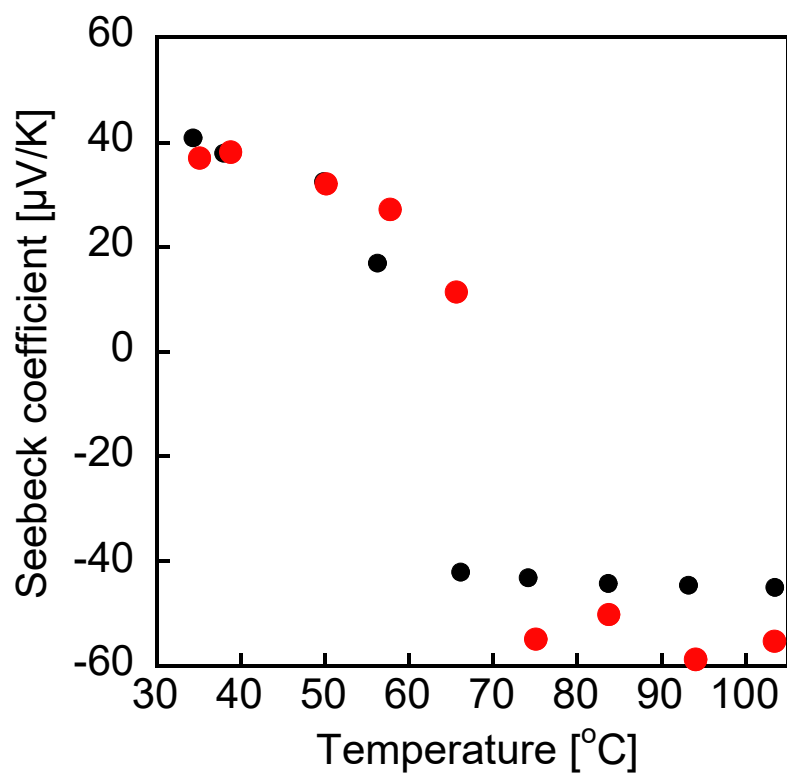


Fig. S5 Temperature dependence of Seebeck coefficient for PBG1-doped SWCNT sheets in a helium atmosphere (black) and the sheets after 24 hours of exposure in air (red).

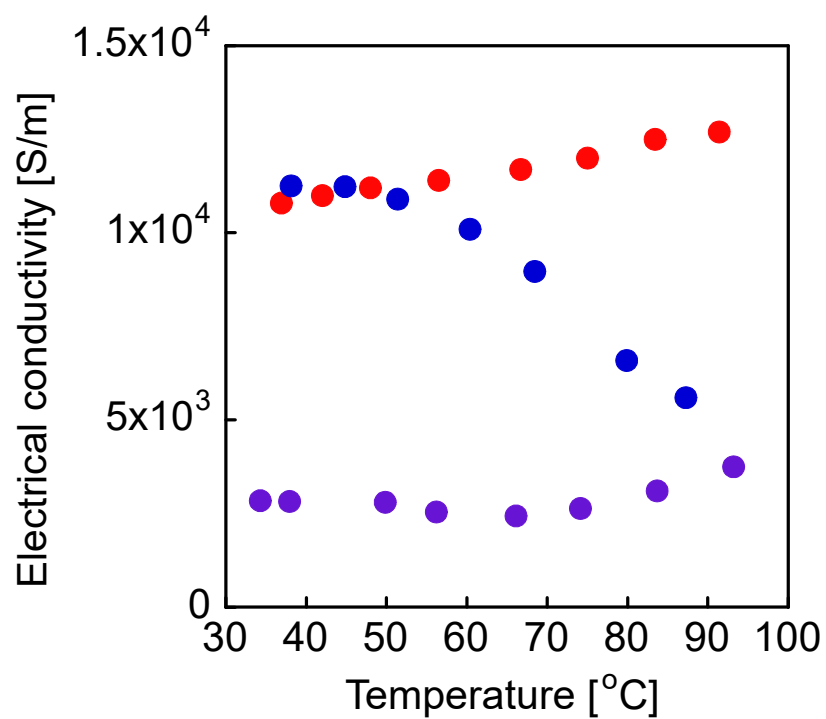


Fig. S6 Temperature dependence of Seebeck coefficient for PBG1-doped SWCNT sheets measured in air (blue), photodoped SWCNT sheets in air (red) and PBG1-doped SWCNT sheets in a helium atmosphere (purple).

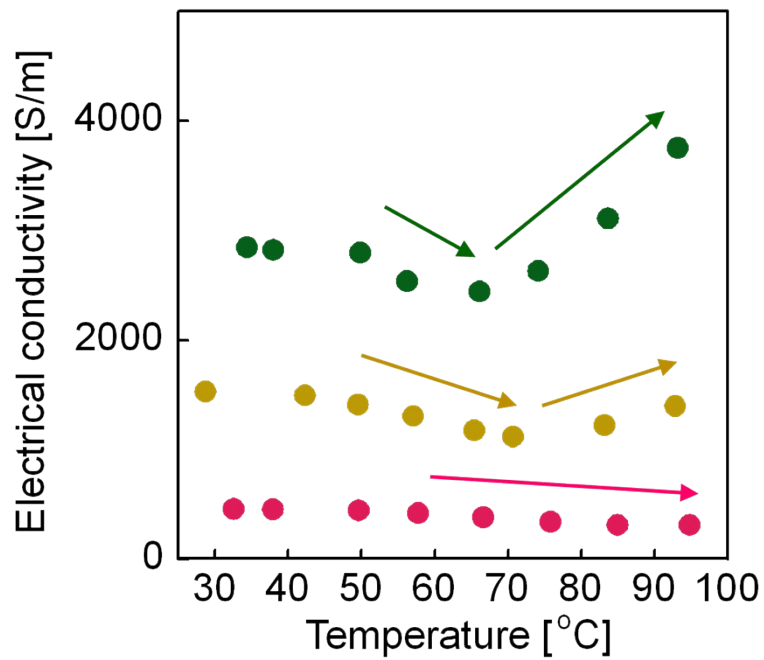


Fig. S7. Temperature dependence of electrical conductivity for PBG1-doped SWCNTs with average diameters (D_{avg}) of 1.5 (green), 1.3 (yellow), and 0.78 nm (red).

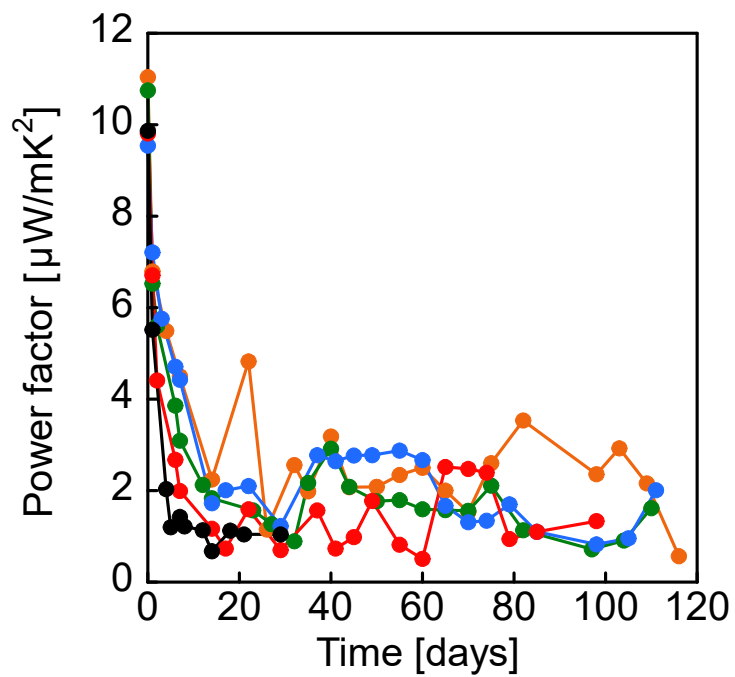


Fig. S8. Time dependence of power factor in air for photodoped SWCNT sheets (n-type) prepared using 10 (black), 20 (red), 30 (blue), 40 (green), and 50 (orange) mM PBG1 solutions.

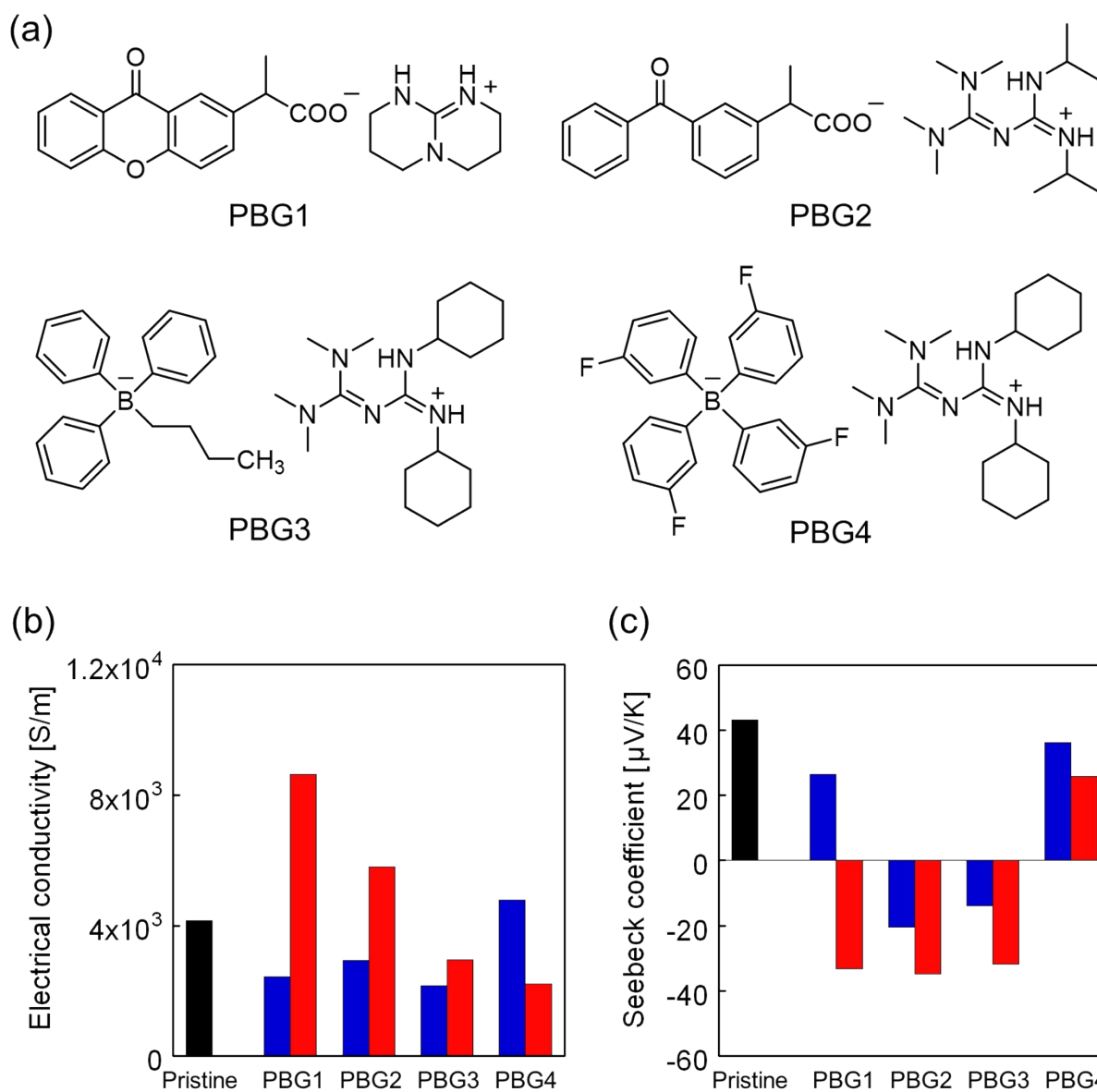


Fig. S9. Photoinduced electron doping of SWCNTs using PBG1, PBG2, PBG3, and PBG4. (a) Chemical structures of PBG1, PBG2, PBG3, and PBG4. (b) Electrical conductivity and (c) Seebeck coefficient under helium of pristine SWCNT, PBG1-doped SWCNT, PBG2-doped SWCNT, PBG3-doped SWCNT, and PBG4-doped SWCNT before (blue) and after (red) UV irradiation for one minute.

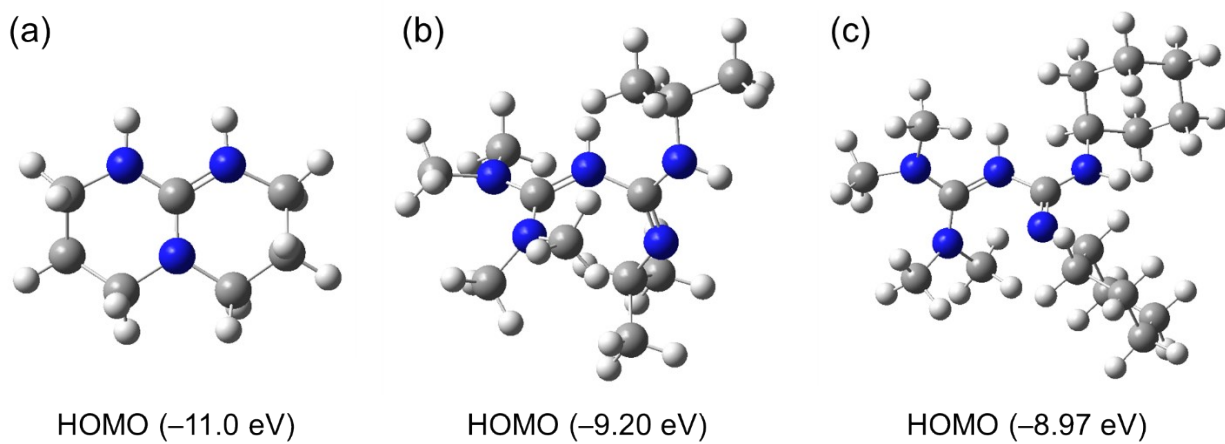


Fig. S10. DFT calculation of HOMO energy levels of counter cations [B3LYP/6-31G(d,p)]. (a) PBG1, (b) PBG2, (c) PBG3 and PBG4.

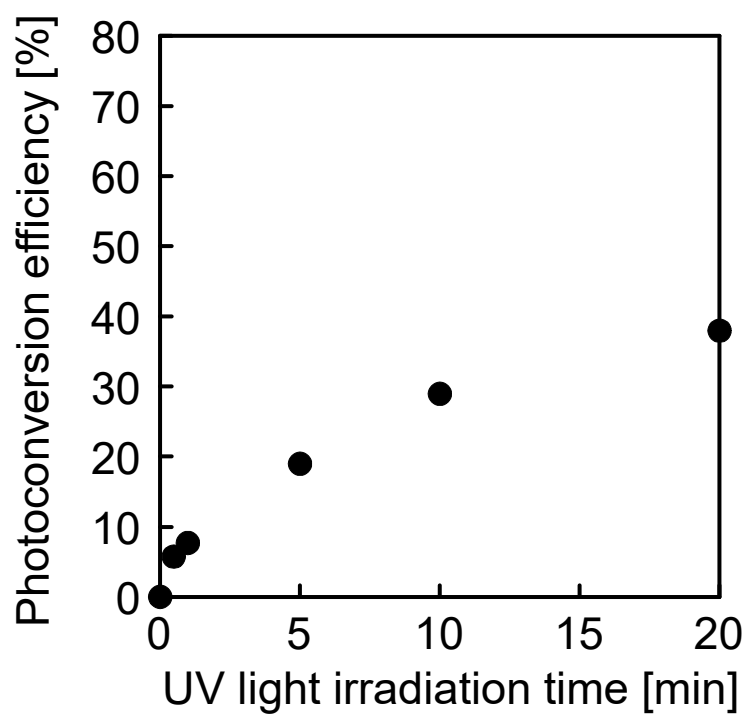


Fig. S11. UV irradiation time dependence of photoconversion efficiency of PBG1 in SWCNT sheets.

Table S1. Resistance of pristine, PBG1-doped and photodoped SWCNT sheets, and the resistance of TEGs.

	1 pattern	2 pattern	4 pattern	6 pattern
Before doping sheets	447 Ω	438 Ω	423 Ω	440 Ω
PBG1-doped sheets	1048 Ω	1041 Ω	1056 Ω	1026 Ω
Photodoped sheets	743 Ω	770 Ω	830 Ω	836 Ω
TEG Devices	509 Ω	445 Ω	488 Ω	450 Ω