## Electronic Supplementary Information

Solid-state, Individual Dispersion of Single-walled Carbon Nanotubes in Ionic Liquidderived Polymers and Its Impact on Thermoelectric Properties

Motohiro Nakano, Yoshiyuki Nonoguchi, \* Takuya Nakashima, Kenji Hata, and Tsuyoshi Kawai\*

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Figure S1. (a) Optical microscopy and (b) scanning electron microscopy images of raw SG-

CNT flakes.



Figure S2. FTIR spectra of PIL composites with SG-CNTs before and after polymerization.

The wavenumber around 1720 cm<sup>-1</sup> derived from C=O stretching of methacrylates.



**Figure S3.** Cross-sectional TEM images of (a) poly**4**, (b) poly**5**, and (c) poly**6** composites with SG-CNTs.



Figure S4. A magnified cross-sectional TEM image of Poly2 composite.



**Figure S5.** X-ray diffraction patterns of (a) SG-CNTs, poly2, and their composite; (b) poly1, and its composite with SG-CNTs; (c) poly3, and its composite with SG-CNTs at 7 wt% of a loading level.



Figure S6. Raman spectra of SG-CNT composites with poly3-6 and raw SG-CNTs.



**Figure S7.** Seebeck coefficient of poly**1-6** composites as a function of the electrical conductivity of SG-CNTs.



Figure S8. Seebeck coefficient of PIL composites as function of the number of intersection in  $1 \ \mu m^2$ .



Figure S9. Mechanical stability of a typical SG-CNT/PIL composite.



**Figure S10.** Seebeck coefficient of buckypapers (left) and poly**2** composites (right) of commercial SWNTs, DWNTs, and MWNTs at 10 wt% of a loading level.