Two Soluble Polymers with Lower Ionization Potentials: Doping and Thermoelectric Properties

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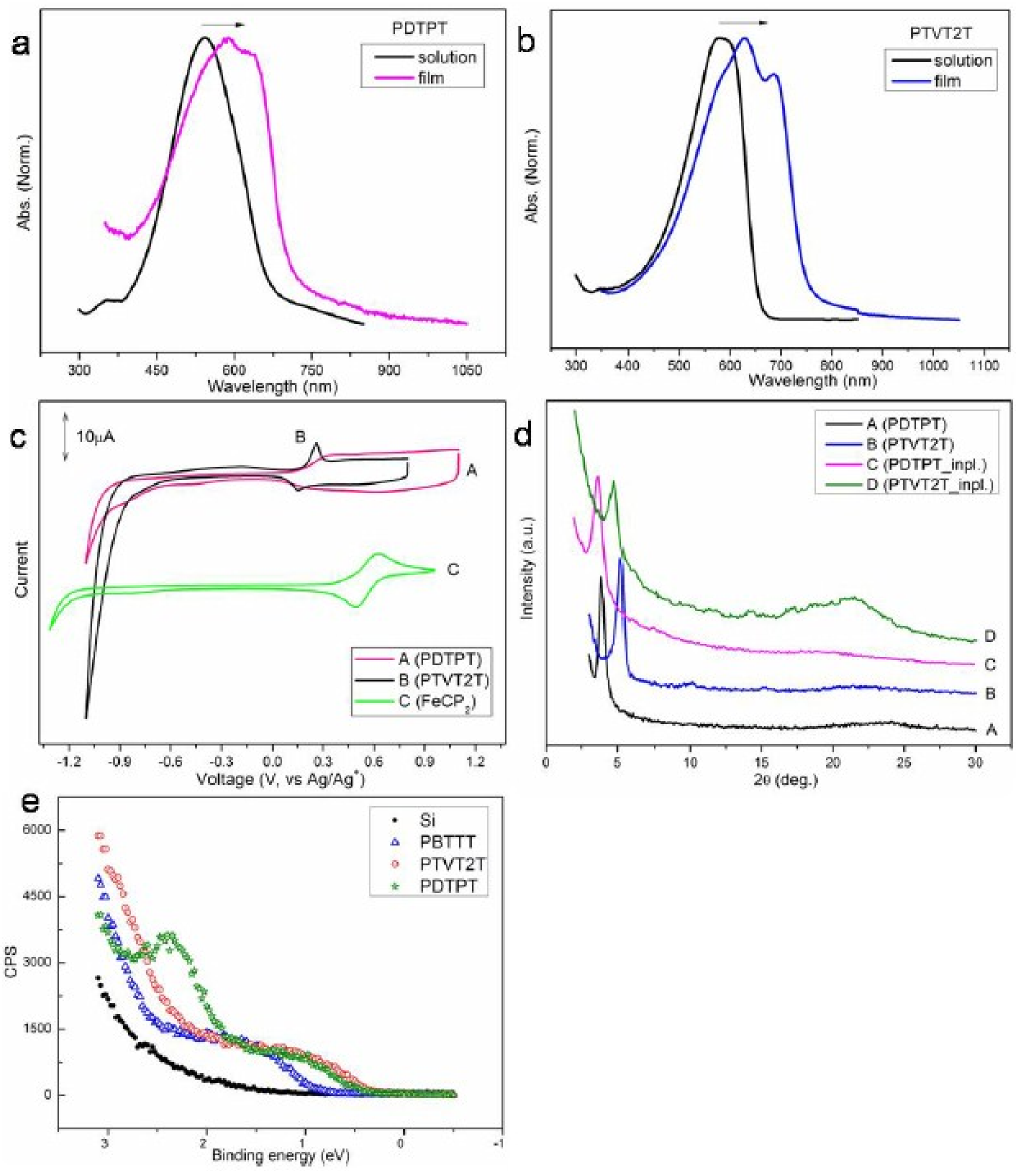

Figure S1. Basic characterizations of the two polymers. (a) and (b) UV-vis NIR absorption spectra, (c) electrochemical cyclic voltammetry, (d) θ-2θ XRD and GIXRD (in-plane), and (e) HOMO onset from UPS characterizations for polymer PDTPT and PTVT2T.

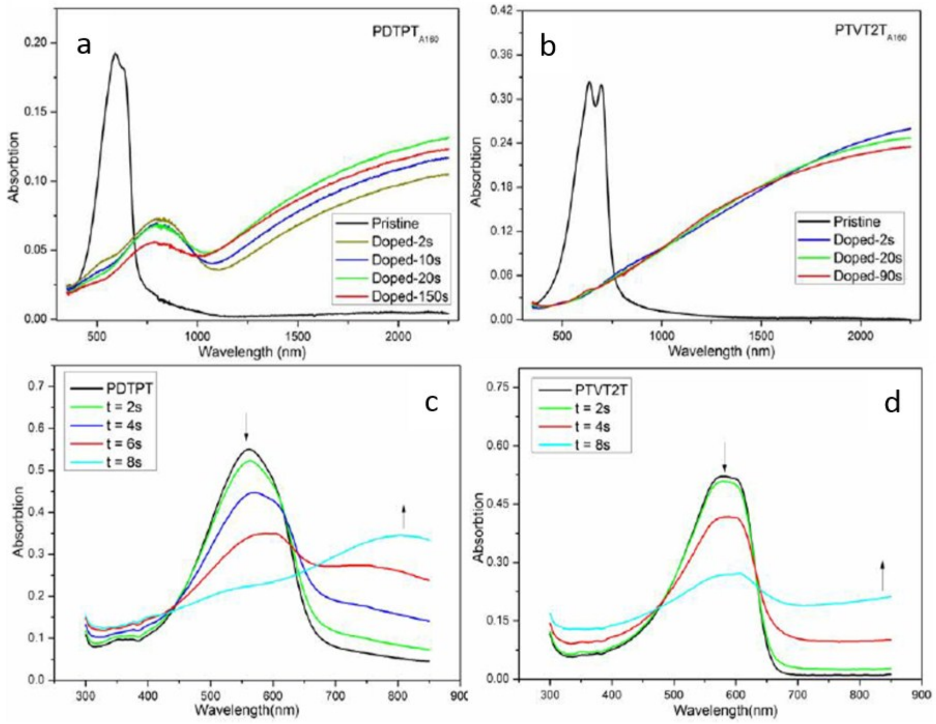

Figure S2. Titration experiment of doping of the two polymers with (a, b) LiTFSI and (c, d) $CuTFSI_2$.

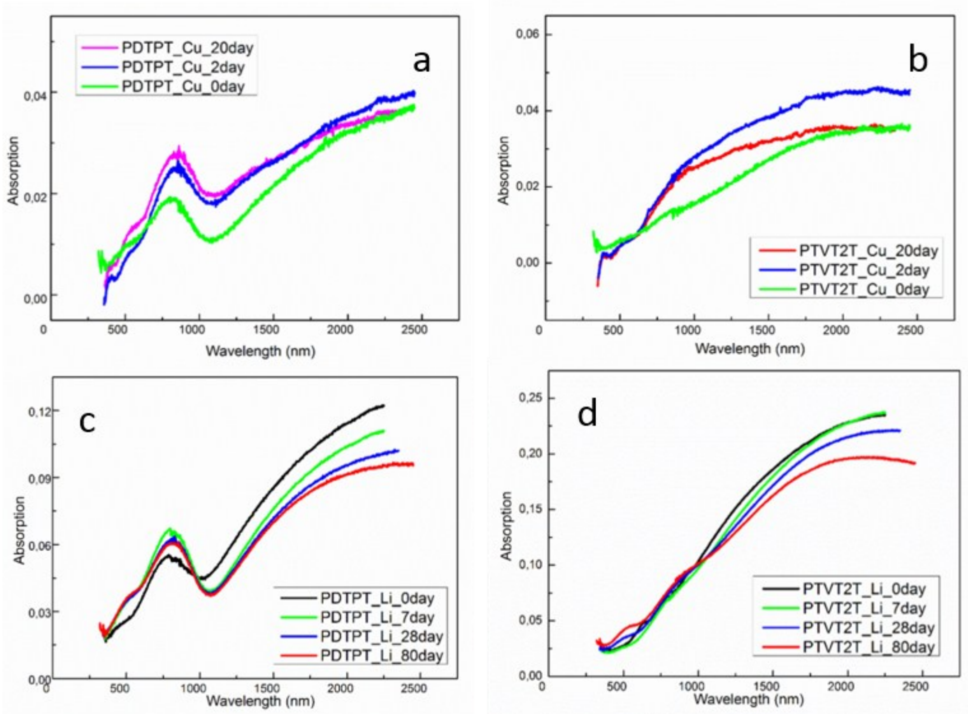

Figure S3. Variation in the UV-vis NIR absorption spectra of the polymer films as they were stored under ambient conditions.

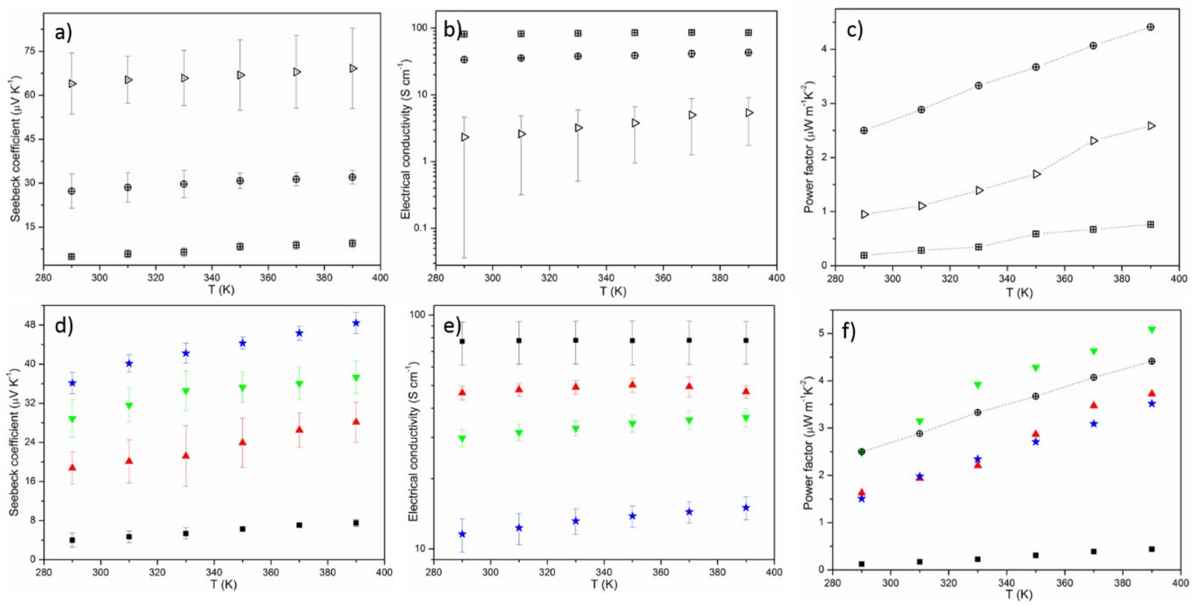

Figure S4. Temperature dependence of (a, d) Seebeck coefficient, (b, e) electrical conductivity and (c, f) power factor of the polymer PTVT2T doped with (a-c, void) $CuTFSI_2$ and (d-f, filled) LiTFSI.

Table S1 Doping levels estimated from XPS S 2p signals by comparing peak areas.

Polymers-Dopant	S_{164}/S_{168}	Repeat unit/$TFSI^-$
PTVT2T-$CuTFSI_2$	1.33	0.67
PDTPT- $CuTFSI_2$	1.51	1.0
PTVT2T-LiTFSI	1.95	0.97
PDTPT- LiTFSI	1.69	1.1

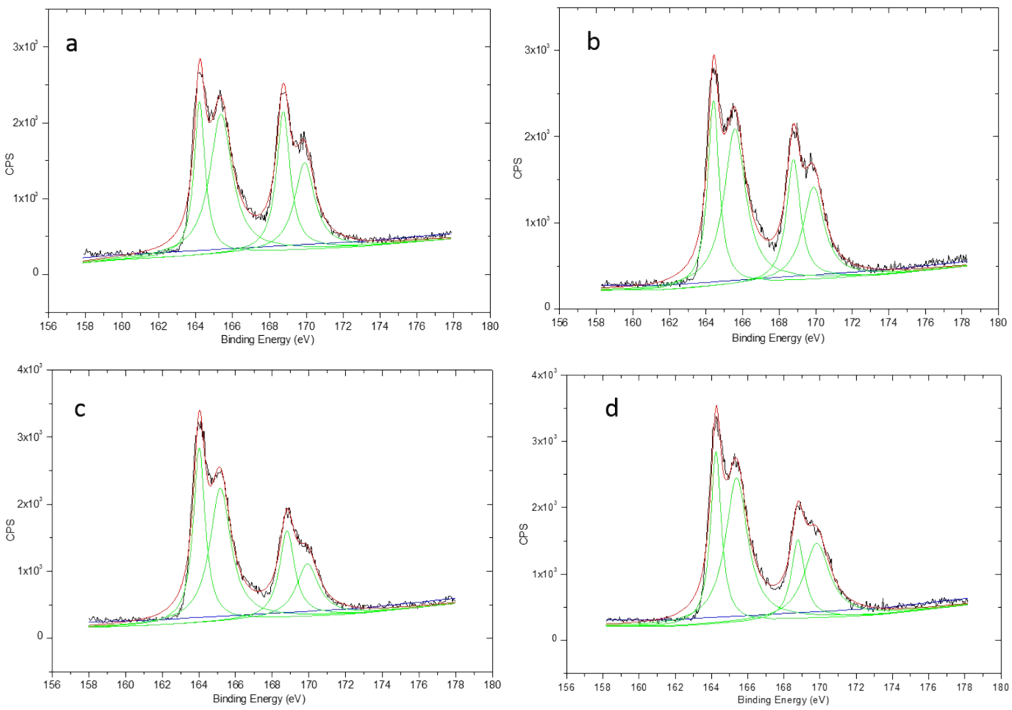

Figure S5. S 2p signal in XPS characterization from four doped samples: (a) PTVT2T- $CuTFSI_2$, (b) PDTPT- $CuTFSI_2$, (c) PTVT2T-LiTFSI, (d) PDTPT-LiTFSI.

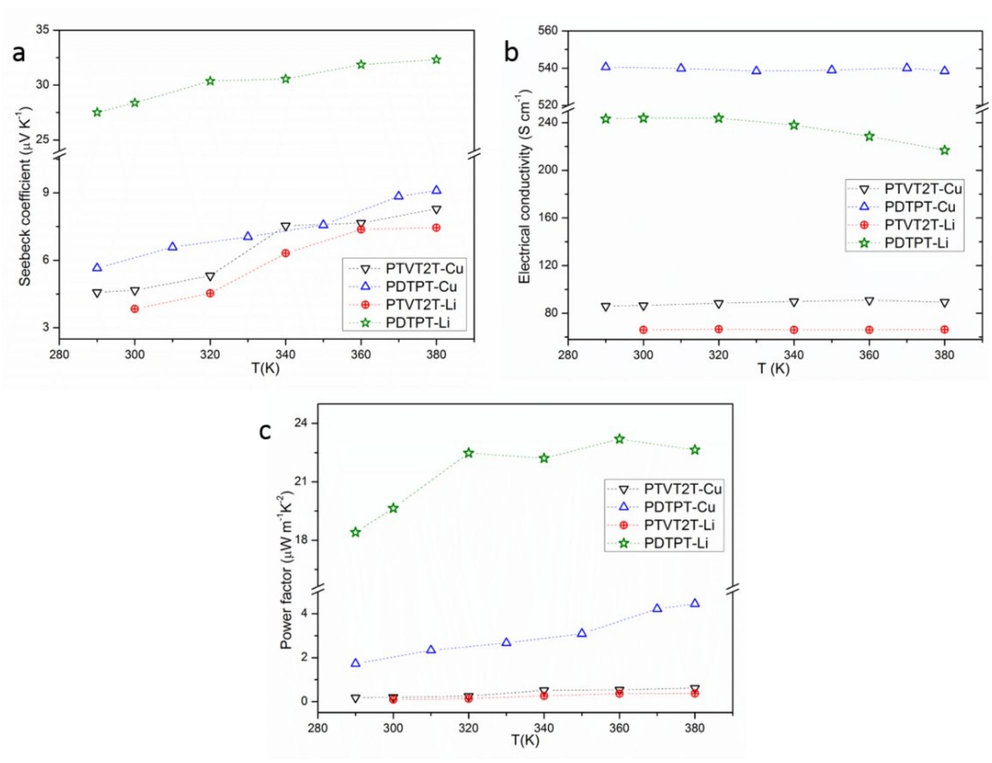

Figure S6. Thermoelectric measurement results for the four doped samples pre-checked by XPS to determine the doping ratios.

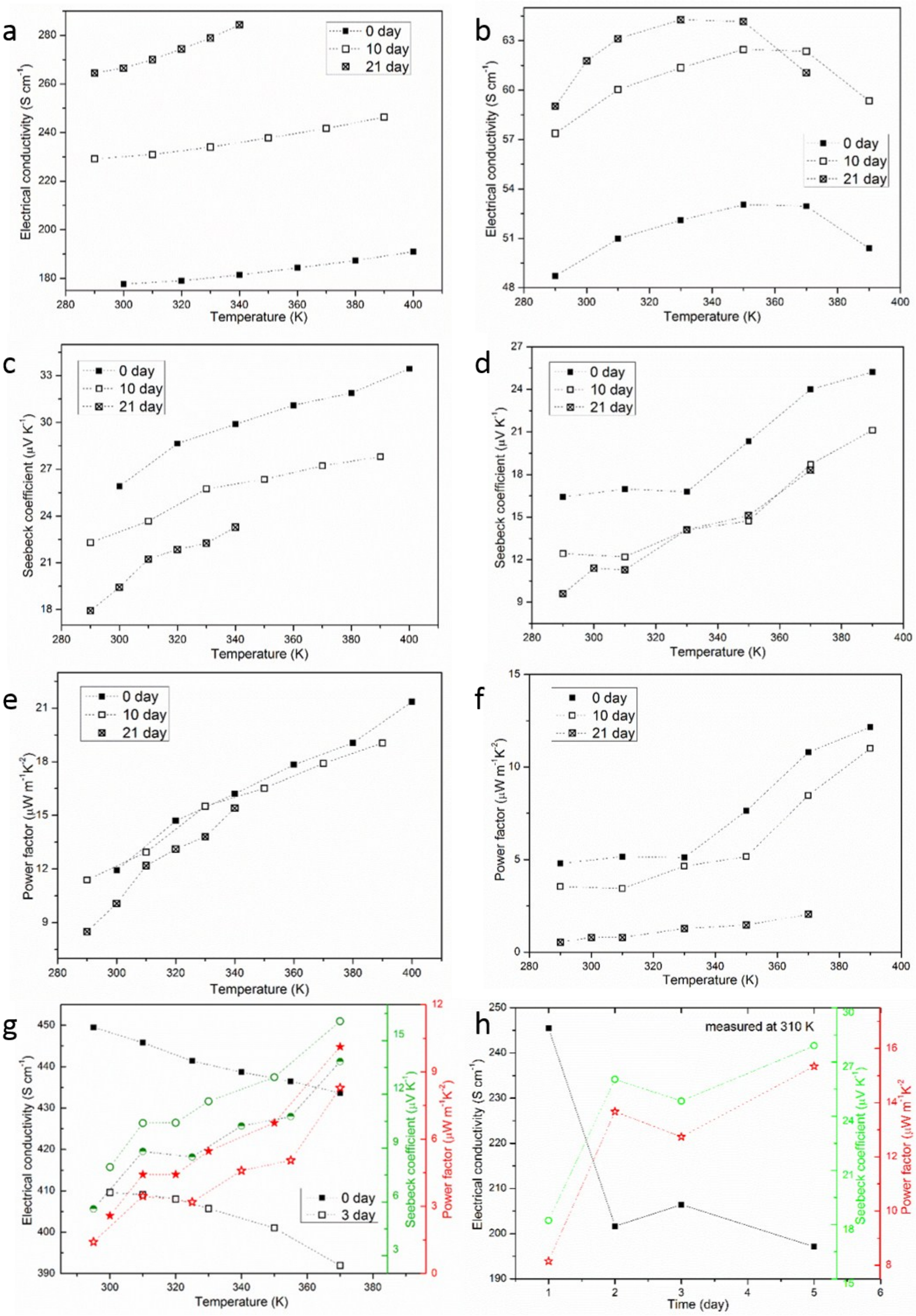

Figure S7. Evolution of thermoelectric performance of PDTPT (a, c, e, g, h) and PTVT2T (b, d, f) during storage in air, and the dopant is $CuTFSI_2$ (g) and LiTFSI (the others).