Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

Thermoelectrochemical cells based on Li^+/Li redox couples in LiFSI glyme electrolytes

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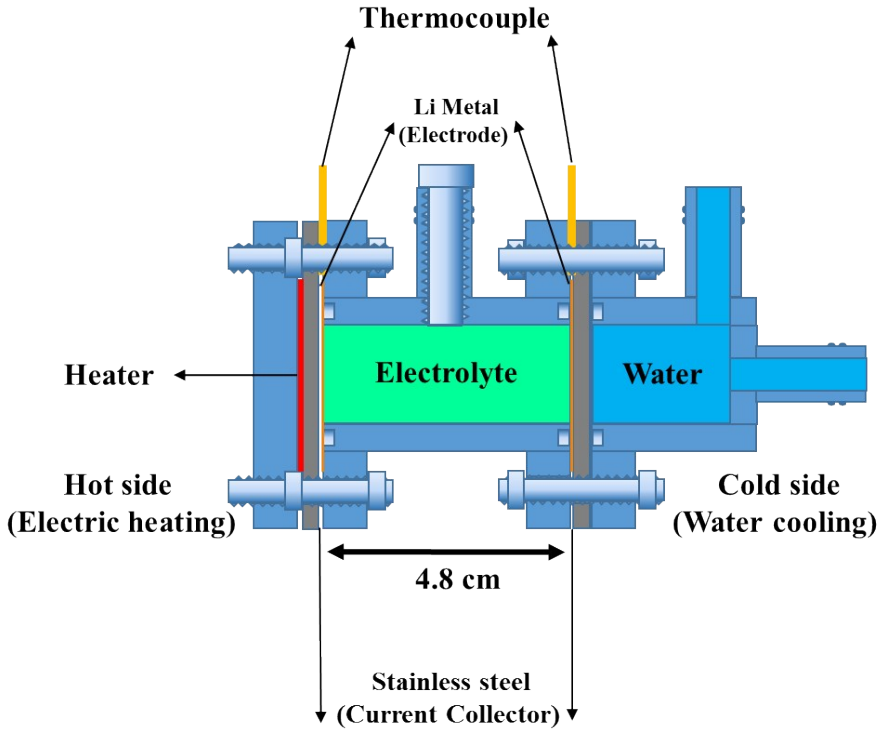

Figure S1. Schematic of the TEC cells with heating and cooling systems. The electrode area is 3.14 cm^2, and the distance of the two electrodes is 4.8 cm.

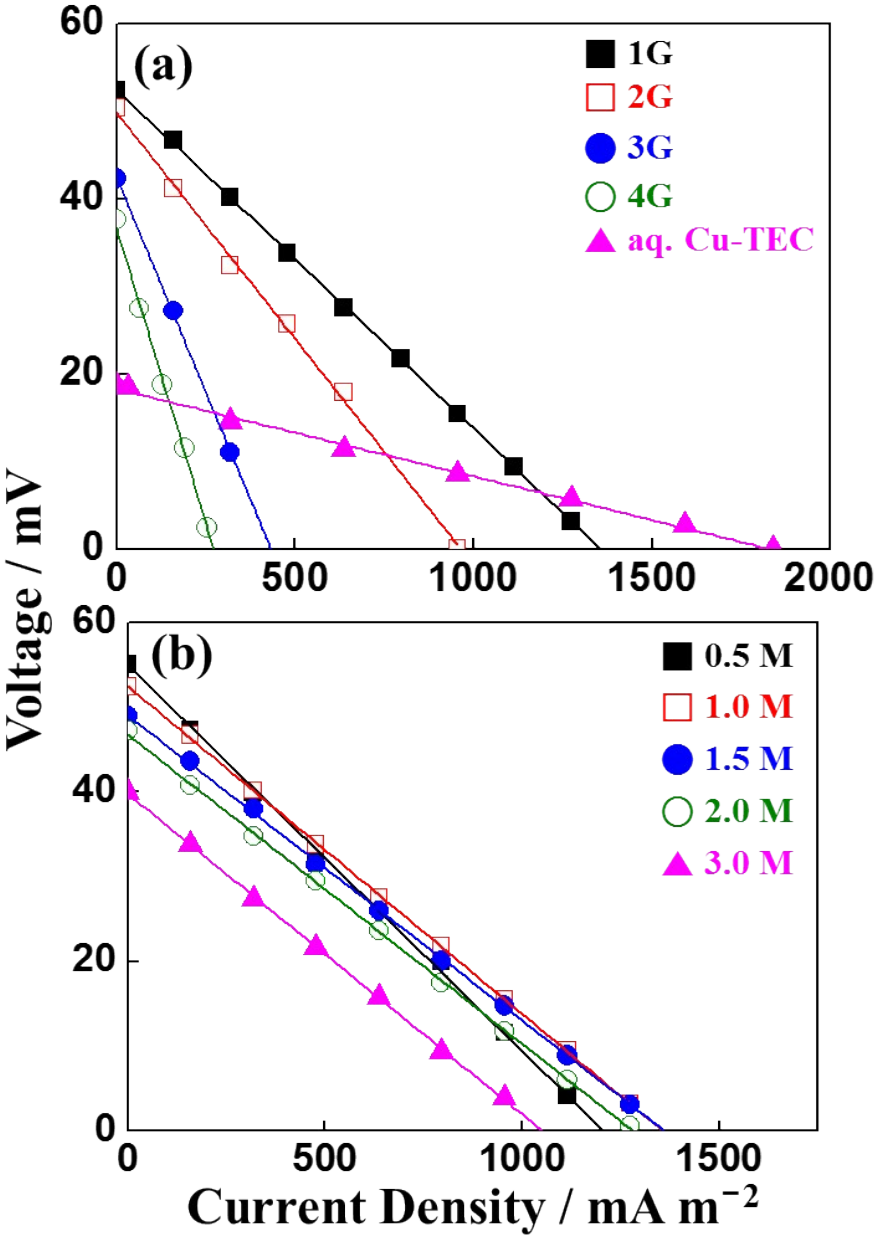

Figure S2. (a) Voltage vs. current density of Li-TECs using a series glyme solutions (1G–4G) of 1.0 M LiFSI salt for T_{cold} of 25 ˚C and T_{hot} of 50 ˚C, and (b) voltage vs. current density of Li-TECs with 1G electrolytes of 0.5–3.0 M LiFSI.

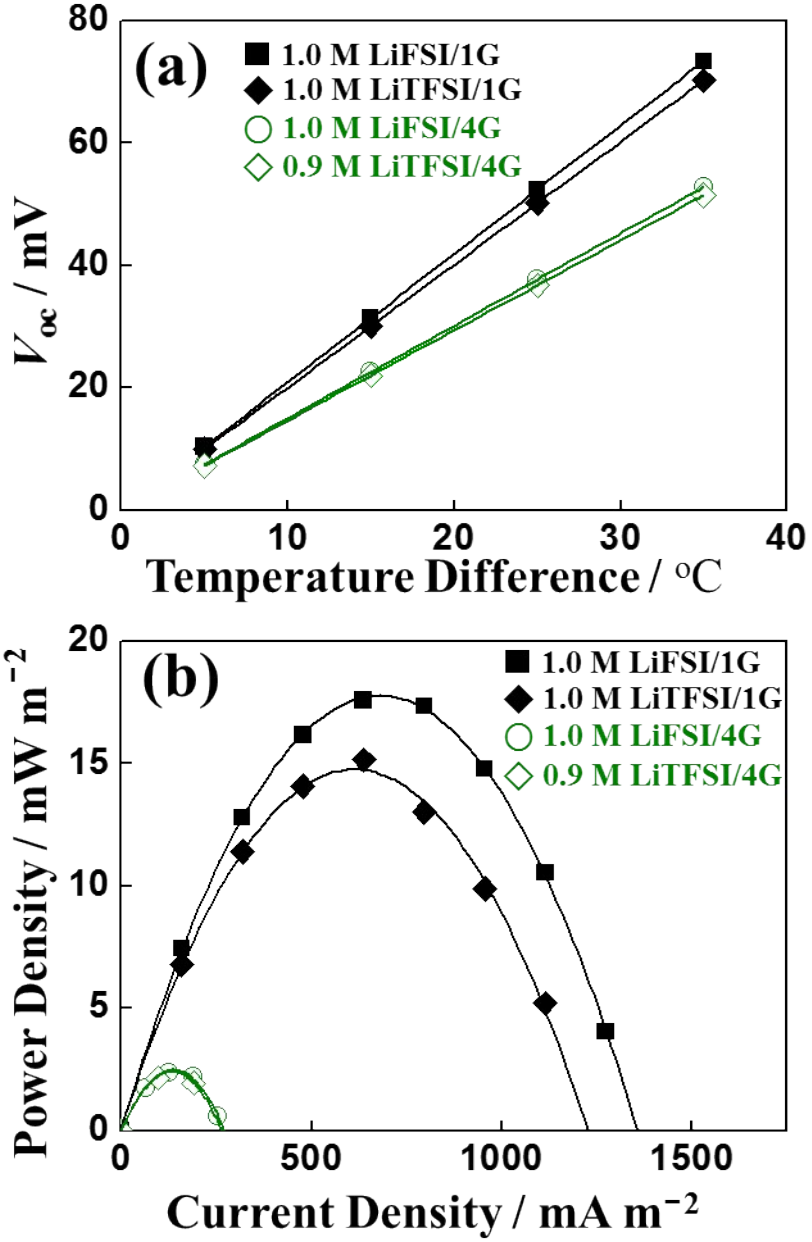

Figure S3. (a) V_{oc} changes vs. temperature difference of Li-TECs with LiFSI or LiTFSI and 1G or 4G electrolytes. T_{hot} was varied over 30−60 ˚C and T_{cold} was fixed at 25 ˚C (b) Power density vs. current density of Li-TECs for T_{cold} of 25 ˚C and T_{hot} of 50 ˚C.

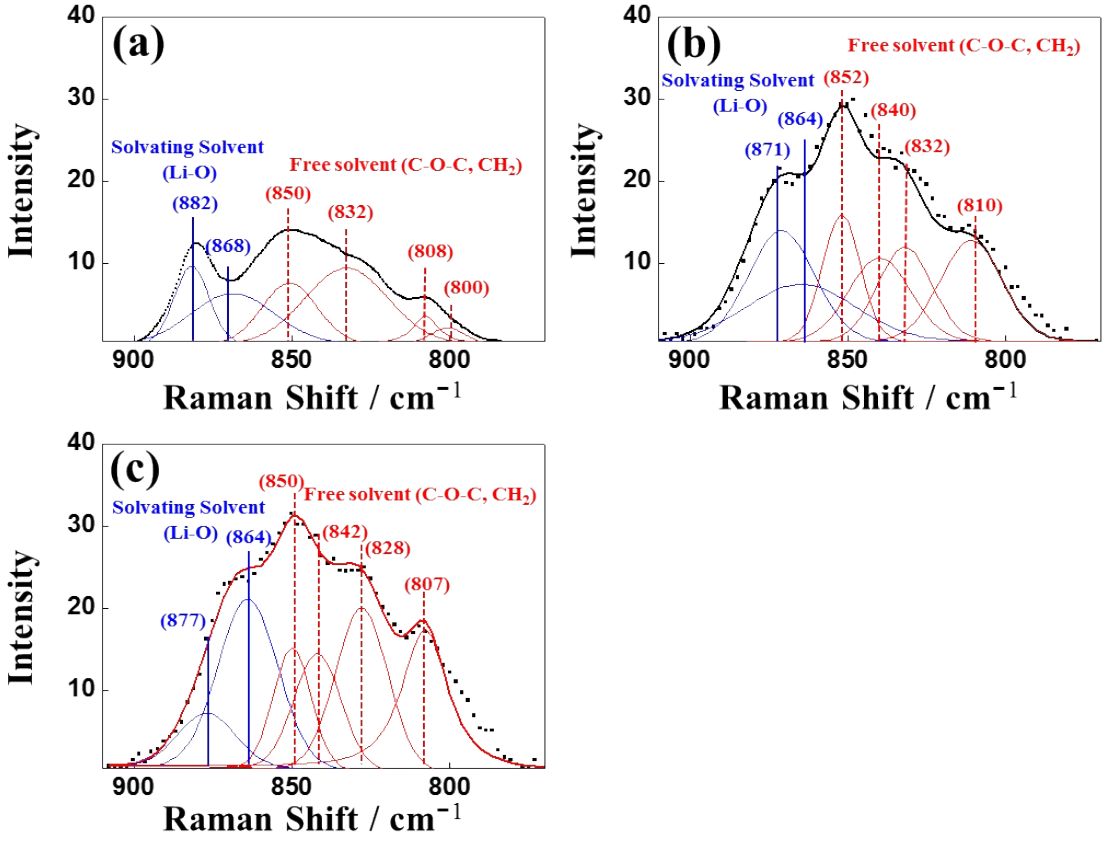

Figure S4. Raman spectra of (a) 2G, (b) 3G, and (c) 4G electrolytes of 1.0 M LiFSI

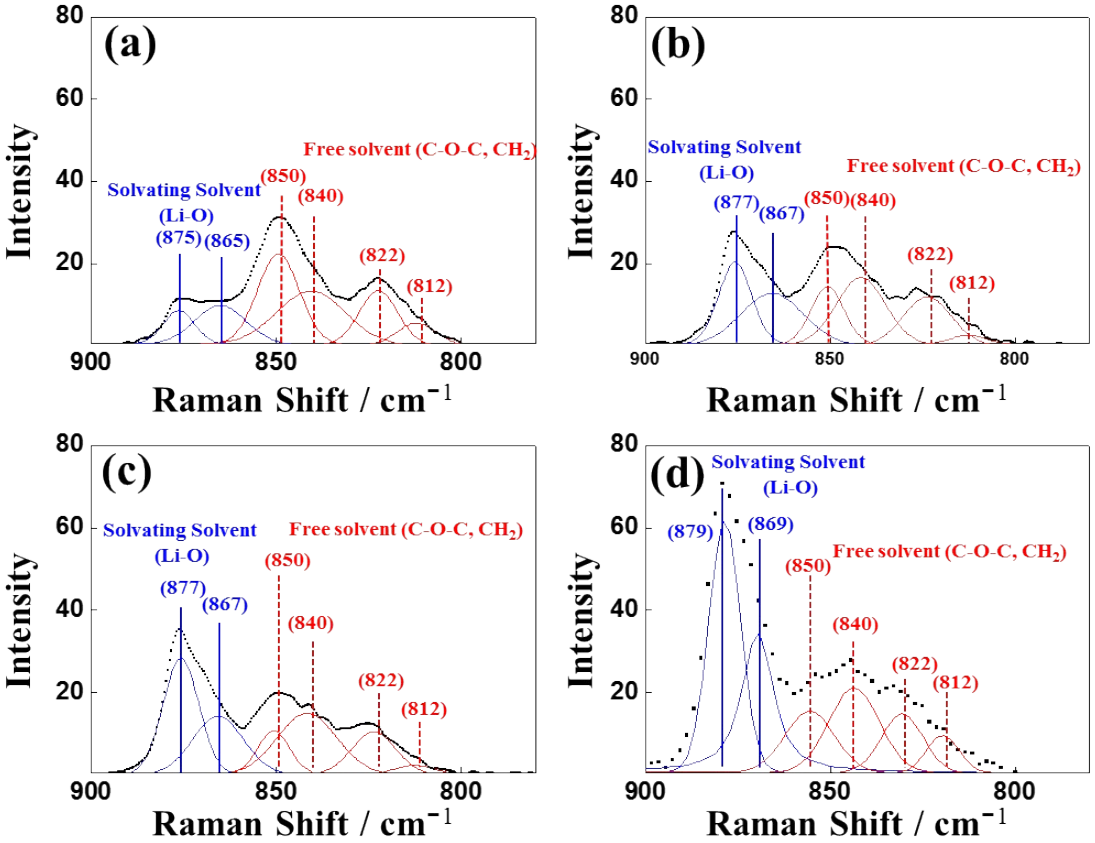

Figure S5. Raman spectra of LiFSI 1G electrolytes of (a) 0.5 M, (b) 1.5 M, (c) 2.0 M, and (d) 3.0 M.

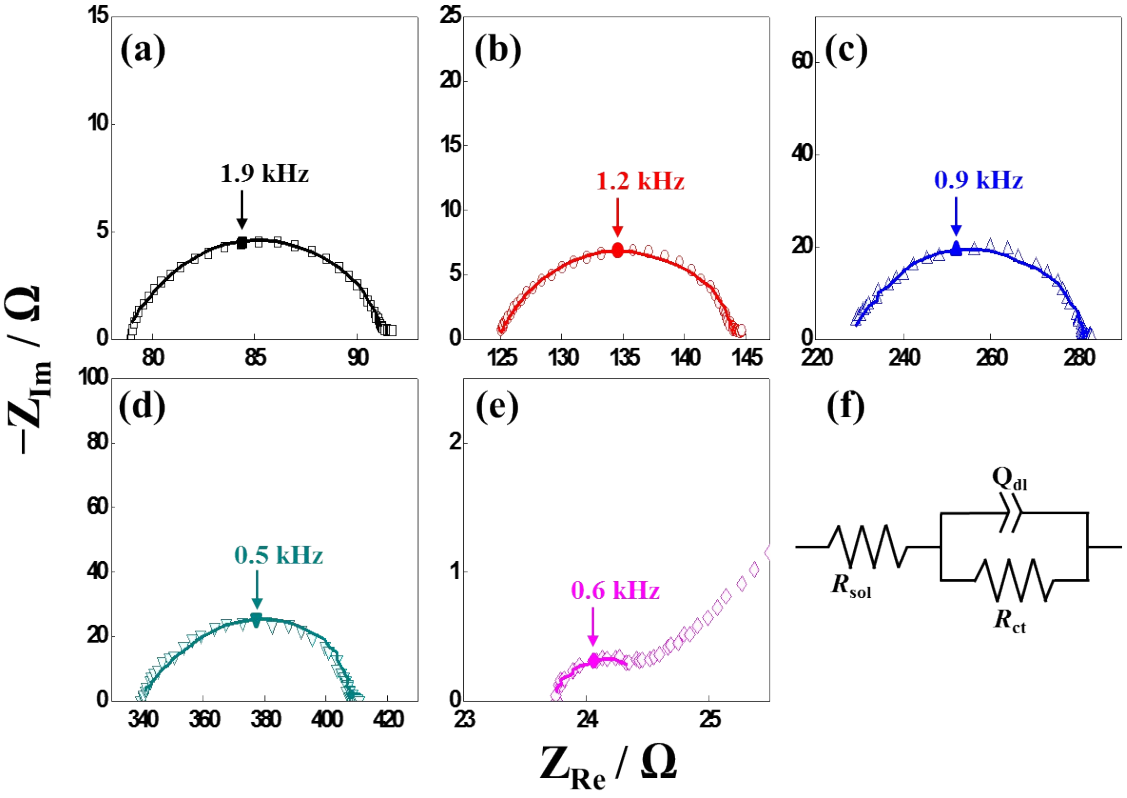

Figure. S6 Electrochemical impedance spectra of Li-TECs with 1.0 M LiFSI (a) 1G, (b) 2G, (c) 3G, (d) 4G, and a Cu-TEC with (e) 0.7 M $CuSO_4$ + 0.1 M H_2SO_4 aqueous electrolyte. (f) Equivalent circuit employed for the fitting of impedance results. The experimental spectra are denoted with circles and the best-fitted results are indicated by solid lines.

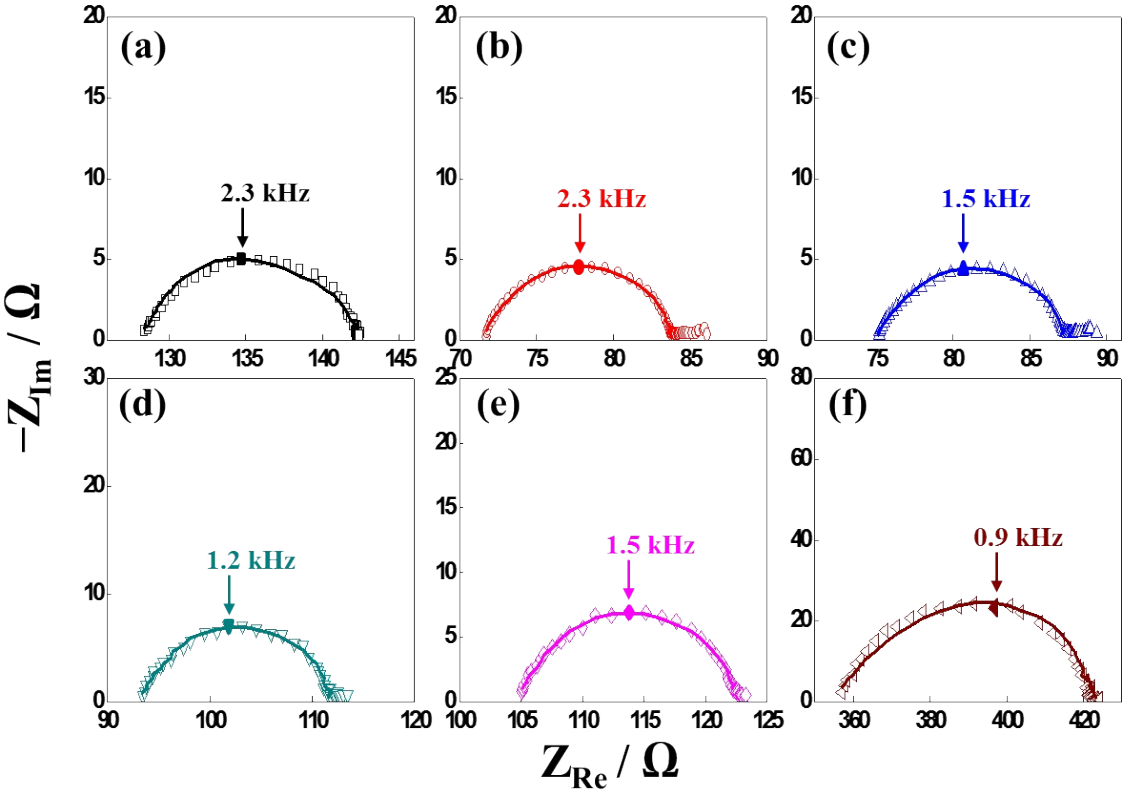

Figure. S7 Electrochemical impedance spectra of Li-TECs with (a) 0.5 M, (b) 1.5 M, (c) 2.0 M, and (d) 3.0 M LiFSI 1G electrolytes, and (e) 1.0 M LiTFSI 1G and (f) 1.0 M LiTFSI 4G electrolytes. The experimental spectra are denoted with circles and the best-fitted results are indicated by solid lines.