Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Supporting Information

Electrochemical characterization of a lithium-ion battery electrolyte based on mixtures of carbonates with a ferrocene-functionalised imidazolium electroactive ionic liquid

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Electrochemical details:

Cyclic voltammetry measurements were performed in a heart-shaped electrochemical cell using a potentiostat from Princeton Applied Research (model PARSTAT 2273). The electrodes were platinum, platinum wire and silver wire as the working, counter and reference electrodes, respectively. The solutions were degassed with nitrogen for 15 minutes prior to measurements. All measurements are referenced against the $E_{1/2}$ of the Fc/Fc^+ redox couple.

50% + 1.5M LiTFSI

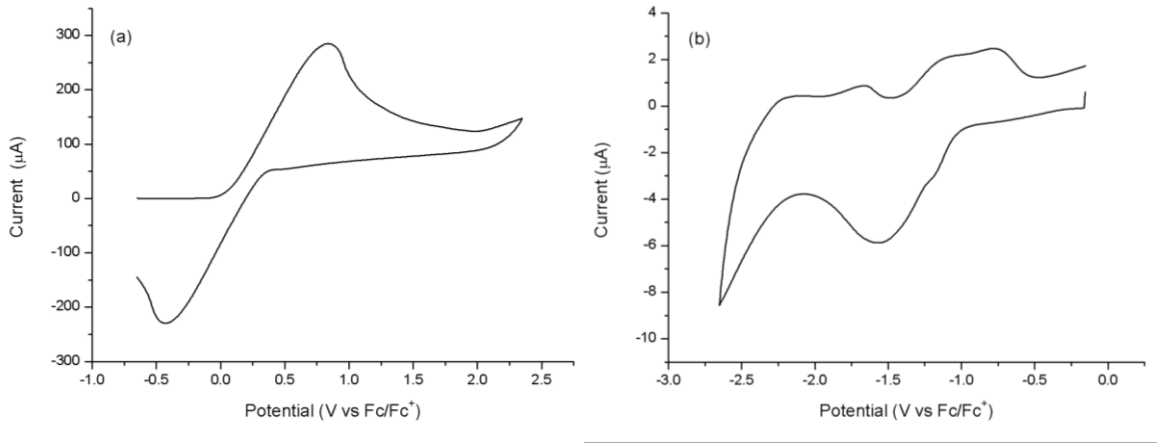

Figure S1. Cyclic voltammograms of (a) oxidation and (b) reduction limits of 50% solution in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

50% (No LiTFSI)

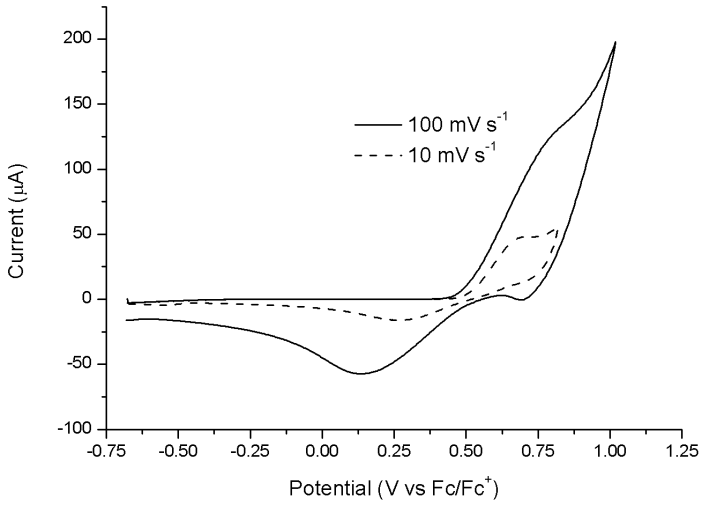

Figure S2. Cyclic voltammogram of 50% ionic liquid in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

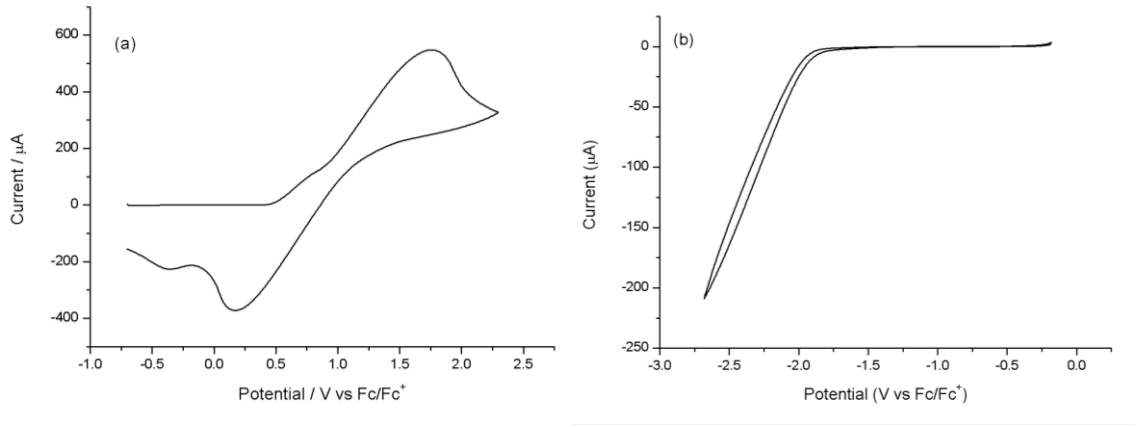

Figure S3. Cyclic voltammograms of (a) oxidation and (b) reduction limits of 50% ionic liquid in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

10% + 1.5M LiTFSI

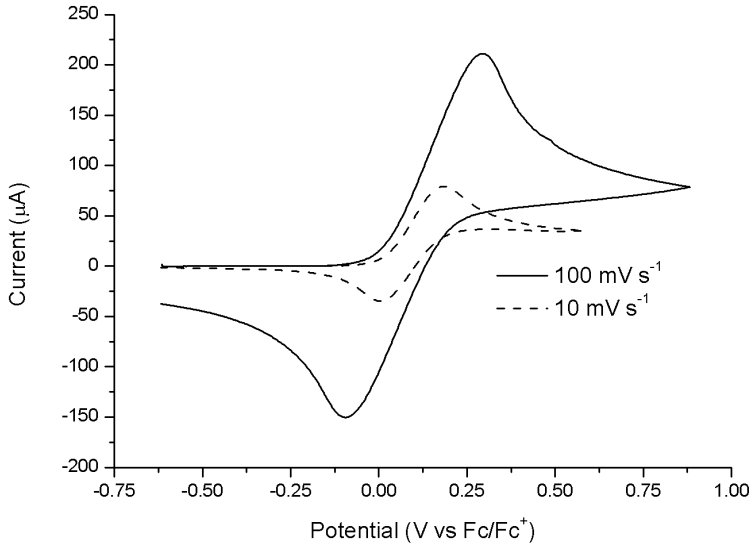

Figure S4. Cyclic voltammogram of 10% solution in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

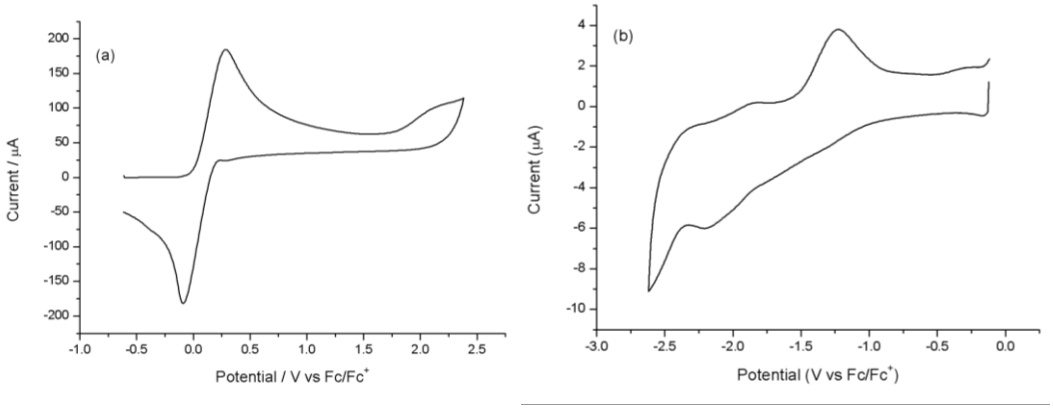

Figure S5. Cyclic voltammograms of (a) oxidation and (b) reduction limits of 10% solution in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

1% + 1.5M LiTFSI

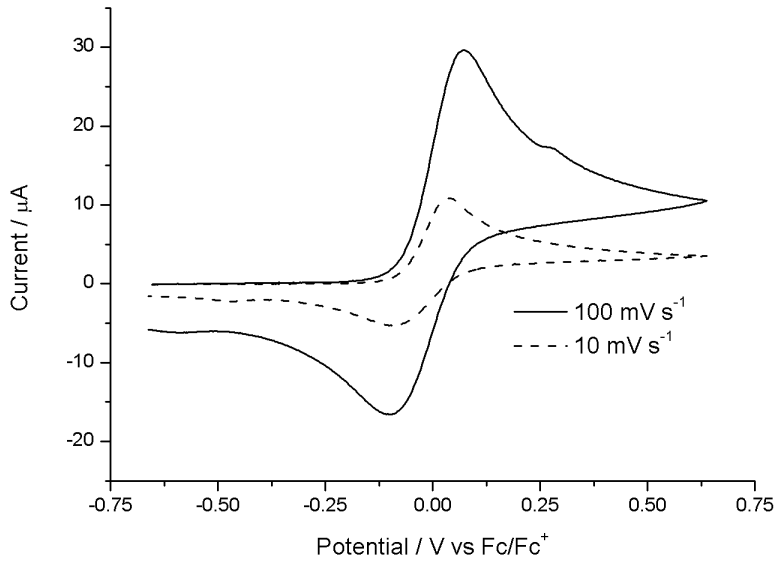

Figure S6. Cyclic voltammogram of 1% solution in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

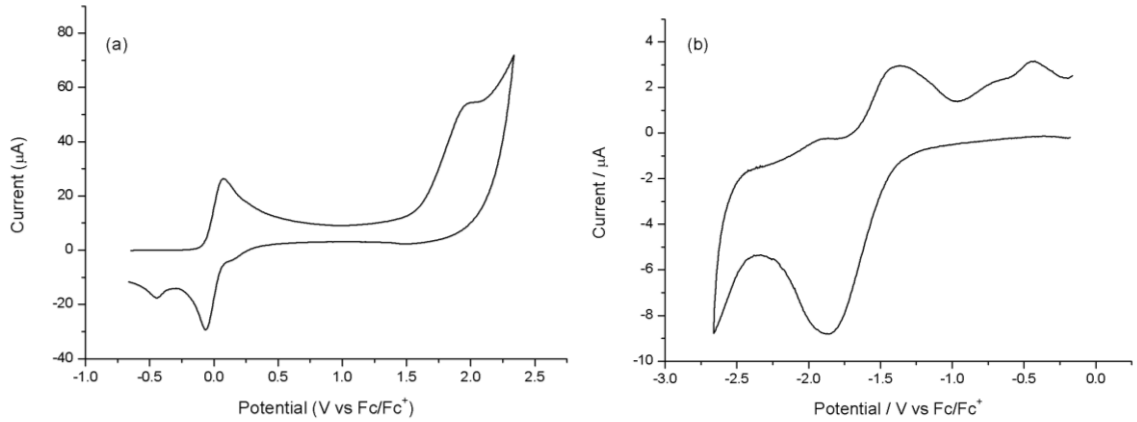

Figure S7. Cyclic voltammograms of (a) oxidation and (b) reduction limits of 1% solution in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

0.34% + 1.5M LiTFSI

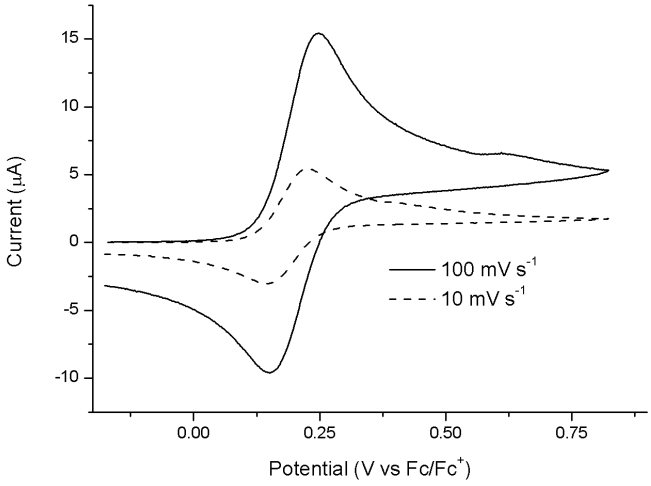

Figure S8. Cyclic voltammogram of 1% solution in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

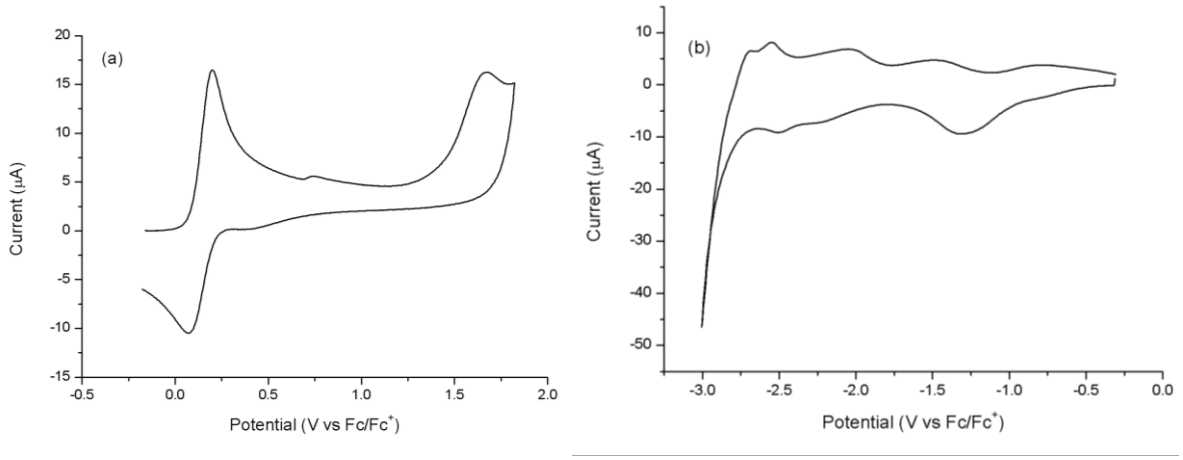

Figure S9. Cyclic voltammograms of (a) oxidation and (b) reduction limits of 0.34% solution in electrolyte of 1.5 M LiTFSI in ethylene carbonate / diethyl carbonate (EC/DEC) (1:2 v/v).

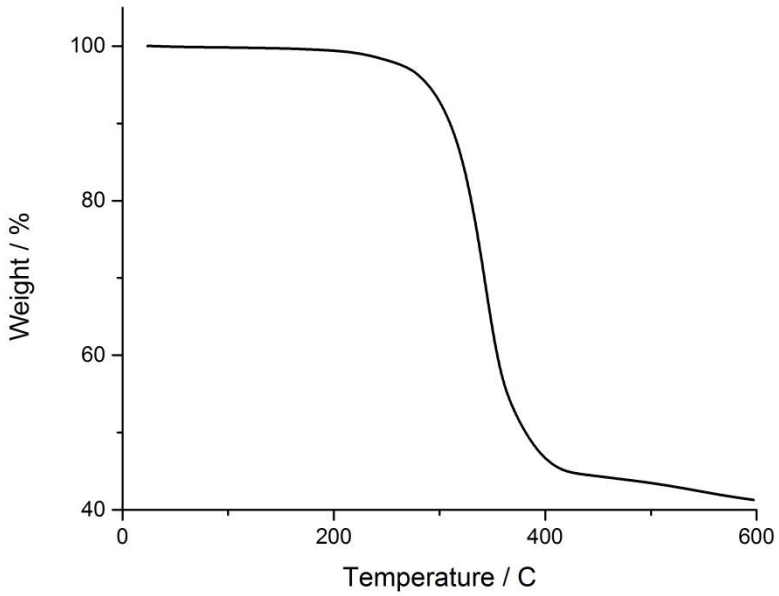

Figure S10. TGA curve for the ferrocenyl(methyl)imidazolium-TFSI redox ionic liquid in the pure form.