

A lithium-ion oxygen battery using polyethylene glyme electrolyte added by ionic liquid

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SUPPLEMENTARY INFORMATION

Figure S1, reporting the Arrhenius plots of the PEG500DME 1m LiTFSI and of the TEG-DME 1m LiTFSI electrolytes, reveals that the former has a conductivity value one order of magnitude lower in respect to the latter, as most likely attributed to its higher viscosity.

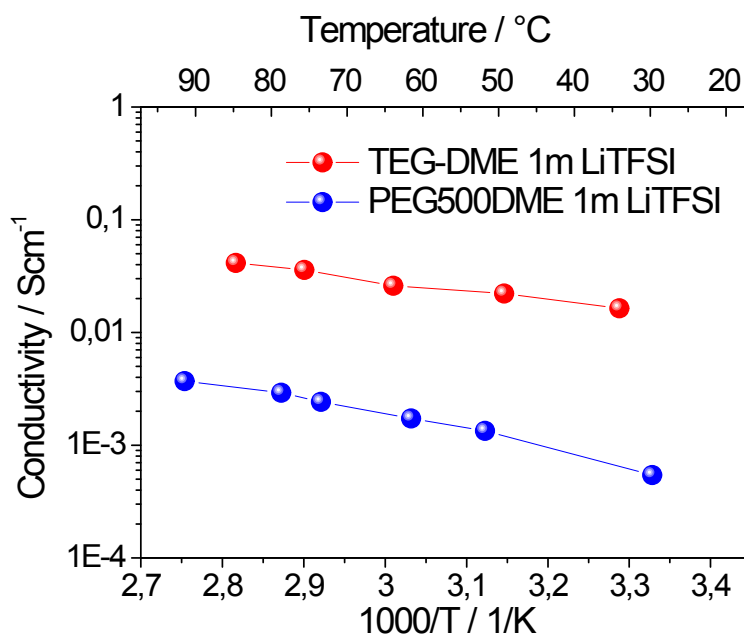


Figure S1 Ionic conductivity Arrhenius plots of the PEG500DME 1m LiTFSI and of the TEG-DME 1m LiTFSI electrolytes within temperature ranging from 25 °C to 100 °C.

The electrochemical windows stability of the electrolyte has been investigated by linear sweep voltammetry and reported in figure S2. The addition of the ionic liquid to the electrolyte slight modifies the electrochemical stability windows that is extended up to about 4.8V.

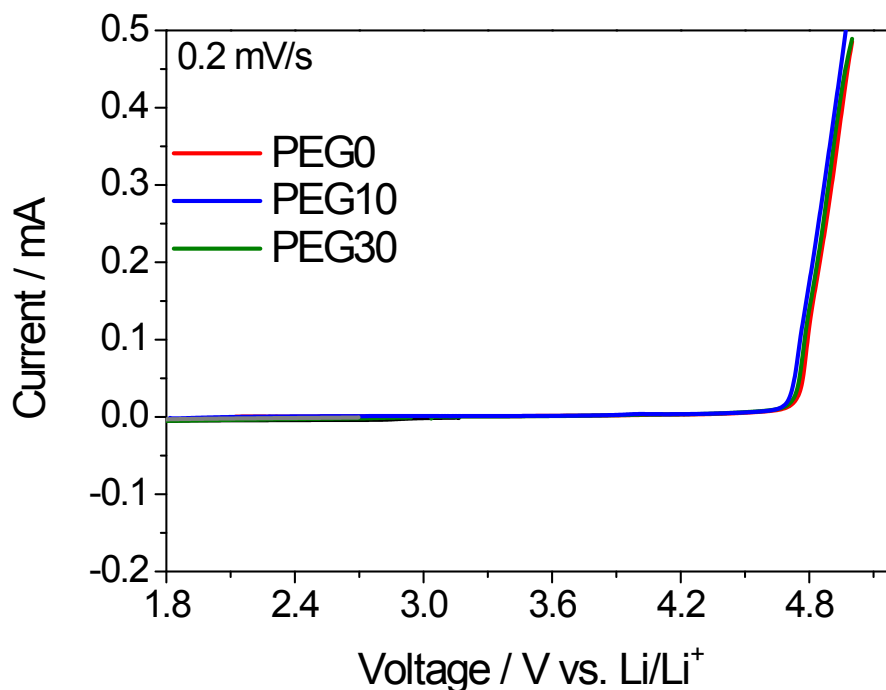
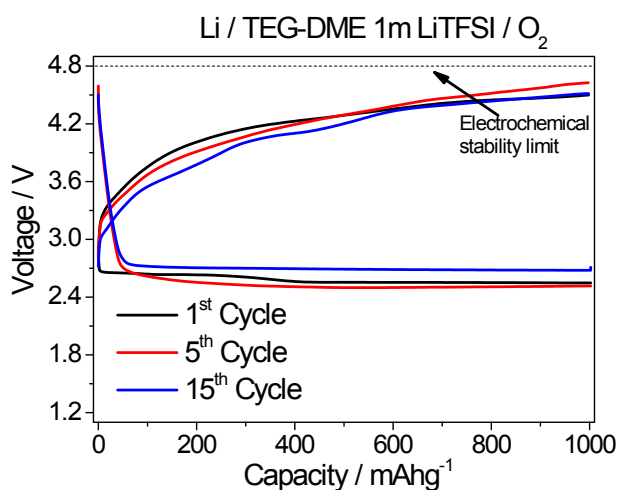
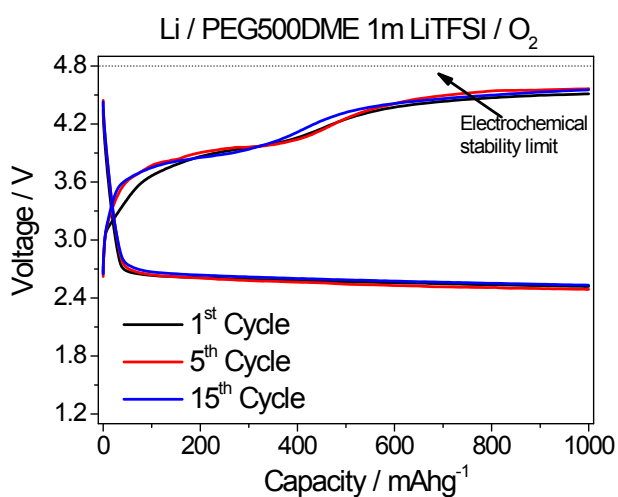


Figure S2 Electrochemical stability window of the PEG0, PEG10 and PEG30 determined by linear sweep voltammetry of a lithium / Electrolyte / Super-C65(Al) cell. Scan rate 0.1 mV s⁻¹, room temperature. For the acronym definition, see manuscript text.

Figure S3 reports the comparison of the galvanostatic cycling behavior of the lithium oxygen cells employing the TEG-DME-based (a) and PEG500DME-based (b) electrolytes. The results demonstrate improved voltage profile stability in the lithium oxygen cell using the PEG500DME-based electrolyte.



(a)



(b)

Figure S3 Voltage signatures of galvanostatic tests performed using the lithium-oxygen cells employing PEG500DME 1m LiTFSI (a) and TEG-DME 1m LiTFSI (b) electrolytes at a current rate of 200 mA g^{-1} , limiting the delivered capacity to 1000 mAh g^{-1} versus the carbon mass.