Supplementary Information



Figure S1. Mercury intrusion porosimetry of the pristine GDE. The porosity is 78 %.



Figure S2. SEM images showing the accumulation of side products at the gas interface over different charge numbers. The GDEs were discharged and charged with 1 M LiTFSI in DME with 50 mM DBBQ and 50 mM TEMPO and the SEM images were taken after several different charge numbers.



Figure S3. Pressure monitoring during discharge and charge of the GDE in 50 mM DBDMB-50 mM TEMPO-1 M LiTFSI in DME at 1 mA cm⁻². 78 % of the pressure is recovered on charge, in line with a Li_2O_2 yield of 80 % after discharge.



Figure S4. Pressure monitoring measurements of gas evolution initiated by oxidation of DBDMB. (a) Pressure monitoring during linear sweep voltammetry of the cell after the 12^{th} charge, showing that further gas evolution begins at 4.1 V vs Li⁺/Li. (b) Pressure monitoring during chronoamperometry at 4.3 V vs Li⁺/Li after the 12^{th} charge.



Figure S5 - Cycling behaviour of a GDE using 50 mM DBDMB -50 mM TEMPO-1 M LiTFSI in DME. 1st represents the GDE cycled starting with a pristine electrode. 2nd is further cycling performance after the first DBDMB⁺ treatment. 3rd represents cycling behaviour after the second DBDMB⁺ treatment.