Supporting information

Capillary based Li-air batteries for in situ synchrotron X-ray powder diffraction studies

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Figure S1: A photo of the capillary battery.

Figure S2: A 5 times discharged cathode. Blue lines: diffraction pattern of Li$_2$CO$_3$. 
Figure S3: The development of the areas of the reflections as a function of capacity during discharge for the 101, 102 and 110 reflections for battery 1.
Figure S4: The development of the areas of the reflections for the first charge of battery 1 for the 100, 101, 102 and 110 reflections.

Figure S5: The development of the FWHM during discharge of battery 1 for the 100, 101, 102 and 110 reflections.
Figure S6: The development of the FWHM during charging of battery 1 for the 100, 101, 102 and 110 reflections.

Figure S7: The discharge curve of battery 2
Figure S8: The decomposition of the Li$_2$O$_2$ reflections in battery 2 as a function of capacity, depending on a 10 minutes exposure to X-ray or constant X-ray exposure. The left equation is for the 10 minutes measurements and the right equation is for the constant X-ray exposure.
Figure S9: The development of the FWHM for battery 2, both with and without constant X-ray exposure. The upper limit reached for the 100 reflections is due to the fitting procedure for the data.

Figure S10: Left: The 1st discharge/charge curves of battery 3 measured at 4 µa. Right: The 2nd discharge/charge curves of battery 3 measured at 5 and 6 µa.
Figure S11: The C1s spectra of *ex situ* analyzed cathodes after 1*st* discharge (blue/---) or 2*nd* discharge (green/—) in the capillary Li-O2 battery.