**Supplementary Information**

**Figure S11**: comparison of the 25-29.5° angular range in situ XRD of SnSb/Li at the end of discharge (from $x=3.8$ to 4.3 ) with different Li$_x$Sn calculated XRD: the best agreement is obtained with LiSn.
Figure S12: Magnified regions of the in situ X-ray diffraction patterns of the (Sn+Sb)/Li cell.
Figure S13: a) Galvanostatic derivative curves for SnSb/Li, (Sn+Sb)/Li and Sb/cell.