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Supplementary Information

Inserting a lithiation potential gap as a factor for degradation control in aluminum-foil anodes by utilizing roll-bonding processes

Hongyi Li,[1]* Shohei Nishimura,[1] Yuki Nakata,[2] Shingo Matsumoto,[2] Takitaro Yamaguchi,[2] Hiroaki Hoshikawa,[3] Toshiaki Kumagai[3] and Tetsu Ichitsubo[1]*

[1] *Institute for Materials Research, Tohoku University, Sendai 980-8577, Japan*

[2] *Advanced Materials Development Laboratory, Sumitomo Chemical Co., Ltd., Tsukuba 300-3294, Japan*

[3] *Energy and Functional Materials Research Laboratory, Sumitomo Chemical Co., Ltd., Ehime 792-8521, Japan*

* Email: li.hongyi@tohoku.ac.jp; tichi@tohoku.ac.jp

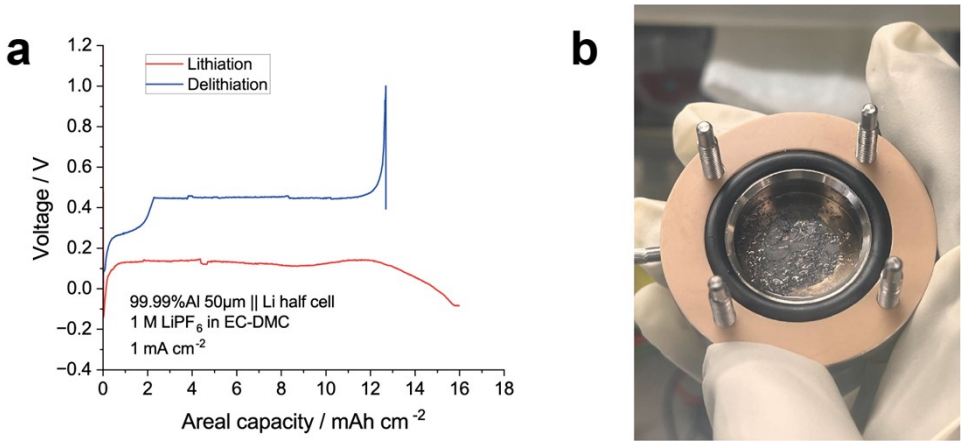

Figure S1. Structure degradation of Al-foil anodes with the absence of base layer. (**a**) Voltage profiles of a 50-μm-thick 99.99%Al foil during entire lithiation and delithiation. (b) A photo of the Al-foil anode in the cell after the experiment. Due to the lack of a base layer, the aluminum foil fractured into pieces.

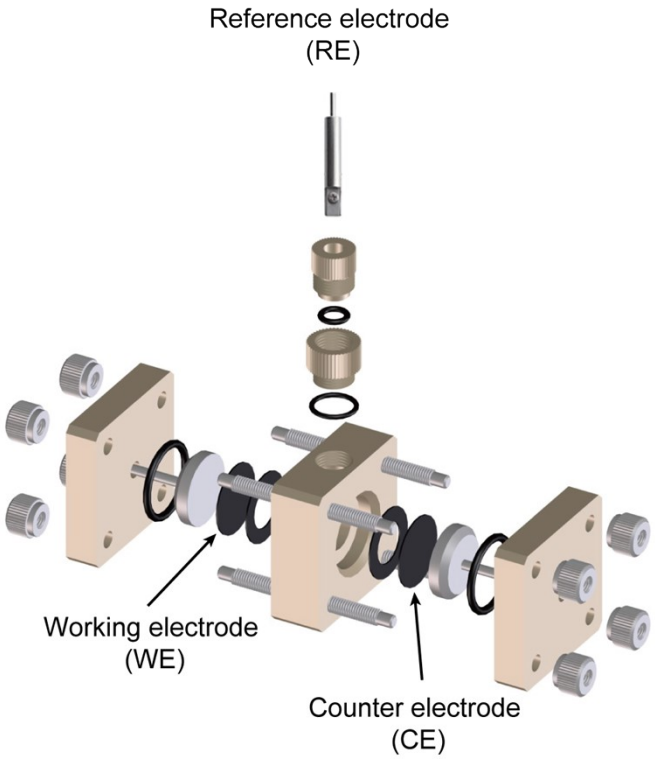

Figure S2. Structure of a three-electrodes batch cell (SB1A, EC-FRONTIER Co., Ltd.). The WE and CE has a have a diameter of 13 mm and are separated with a spacing of 5 mm without a separator.

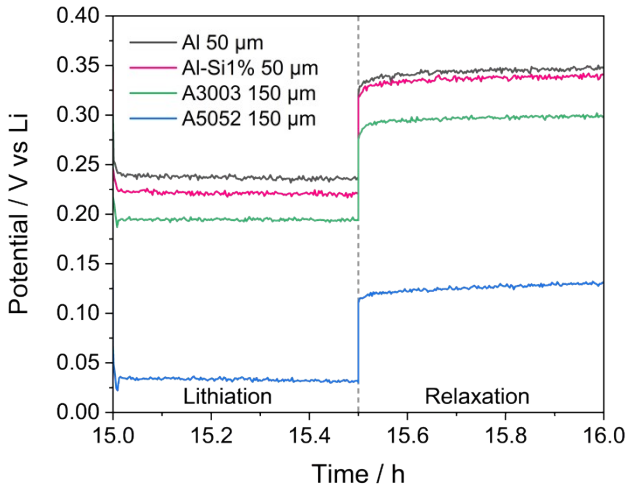

Figure S3. The fourth time of lithiation and relaxation in GITT measurements corresponds to Figure 4. The OCP potential of the Al-foil anodes increased quickly to a stable value. The difference between the OCP potentials and the theoretical electromotive force ~ 0.38 V would be caused by the increase of the strain energy in LiAl phase.