Supporting Information
of
“Natto” binder of poly-γ-glutamate enabling to enhance silicon/graphite composite electrode performance for lithium-ion batteries

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The numbers of pages, figures, and tables are 6, 5, and 0, respectively.

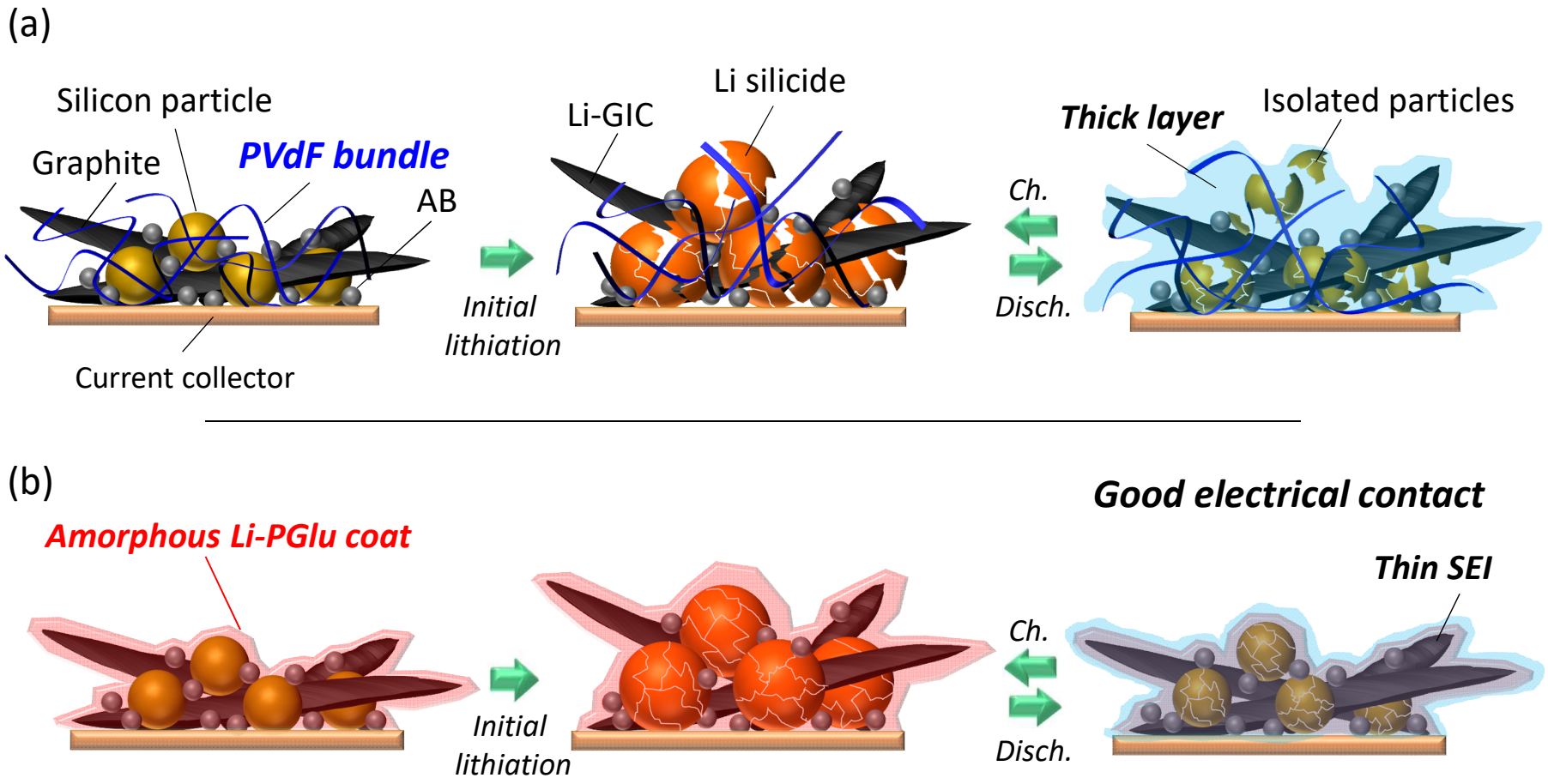


Figure S1 Illustration of morphology change of Si/graphite composite electrode with (a) PVdF and (b) Li-PGlu binders during lithiation and delithiation cycle, accompanied with large volume change by lithium silicide formation and annumulation of electrolyte decomposition products.

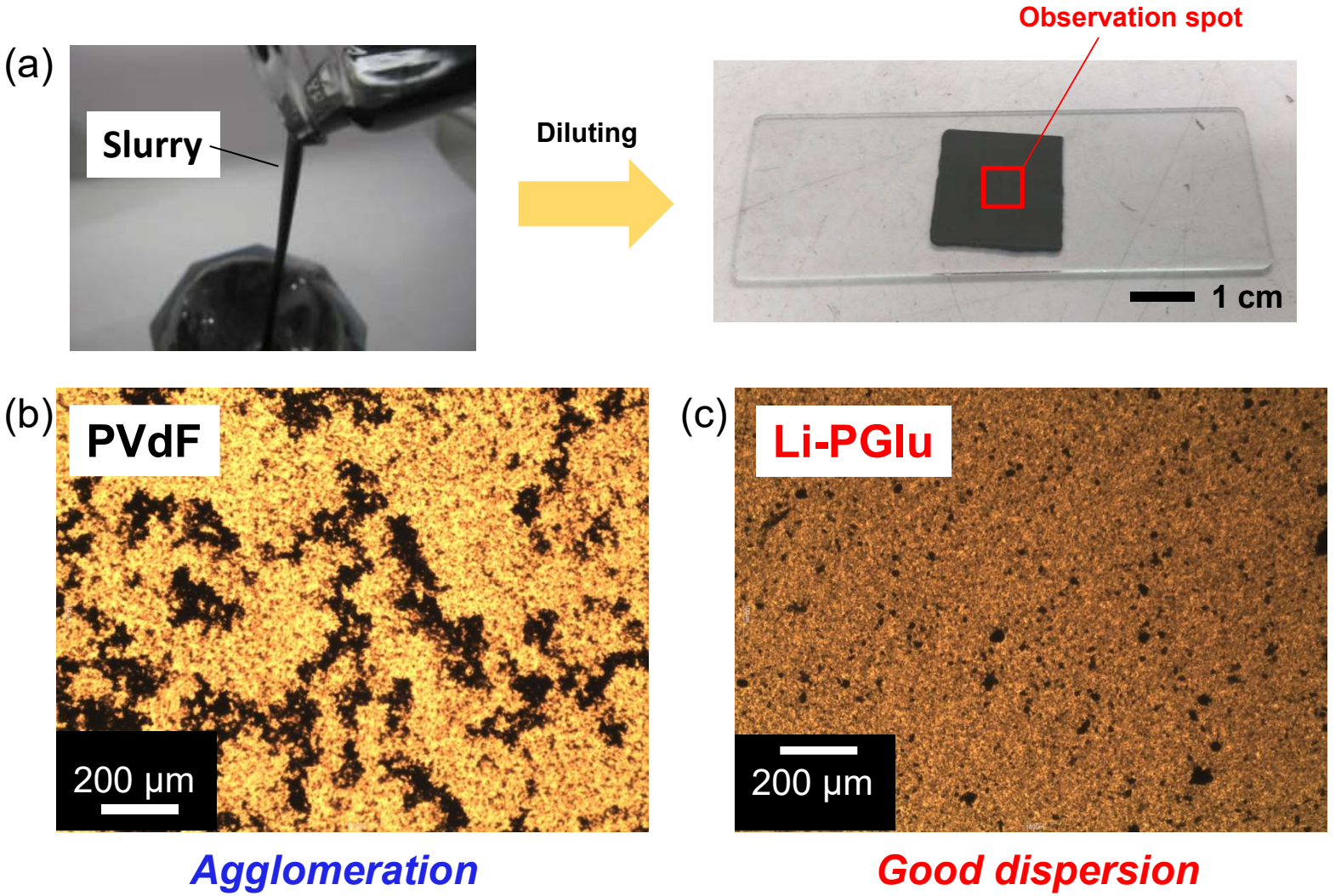
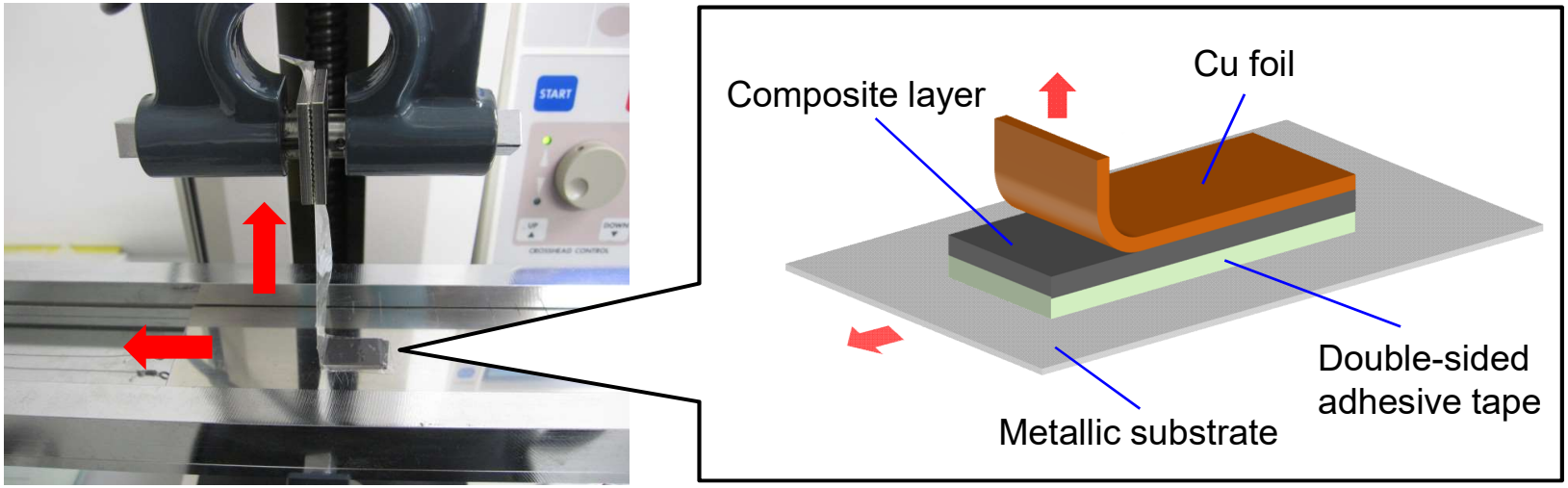
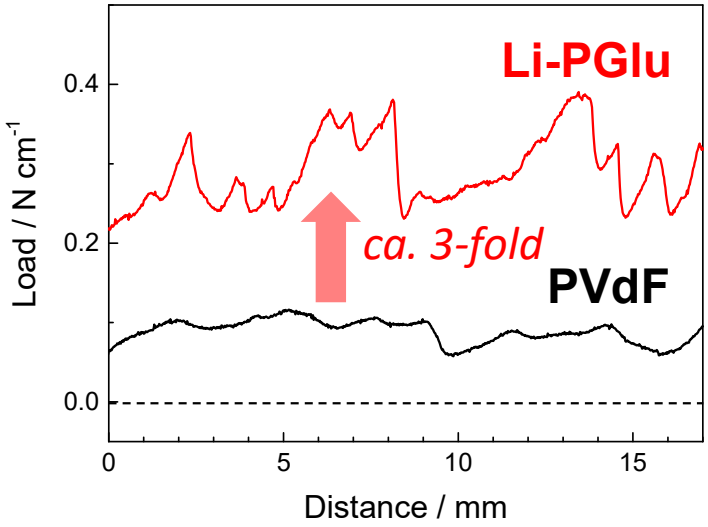


Figure S2 Optical microscopic observation; (a) set-up of slurry sample and images of slurries (electrode mixture dispersion) with (a) PVdF in NMP and (b) Li-PGlu in water.

Photo of setup of 90 °-peel test





	Tention / N cm^{-1}
PVdF	0.09
Li-PGlu	0.29

Figure S3 Adhesive strength test of the PVdF and Li-PGlu compsite electrode onto Cu foil.

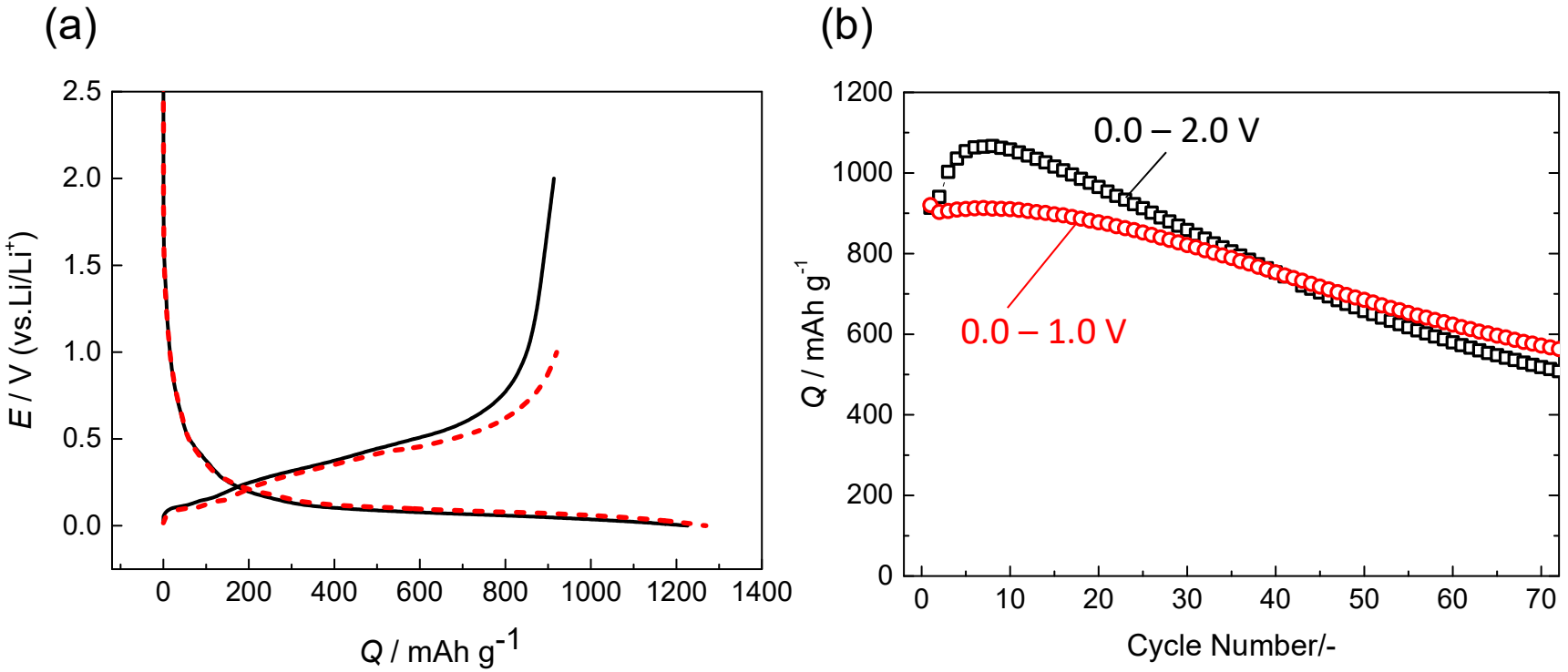


Figure S4 Charge-discharge performance of the electrodes of Si:graphite:AB:Li-PGlu = 3:5:1:3. To modulate emphasis of the binder dependency in the spectra, the binder content in electrode samples for HAXPES measurement was increased from 3:5:1:1 to 3:5:1:3; (a) charge/discharge curves at the first cycle and (b) discharge capacity versus cycle number plots.

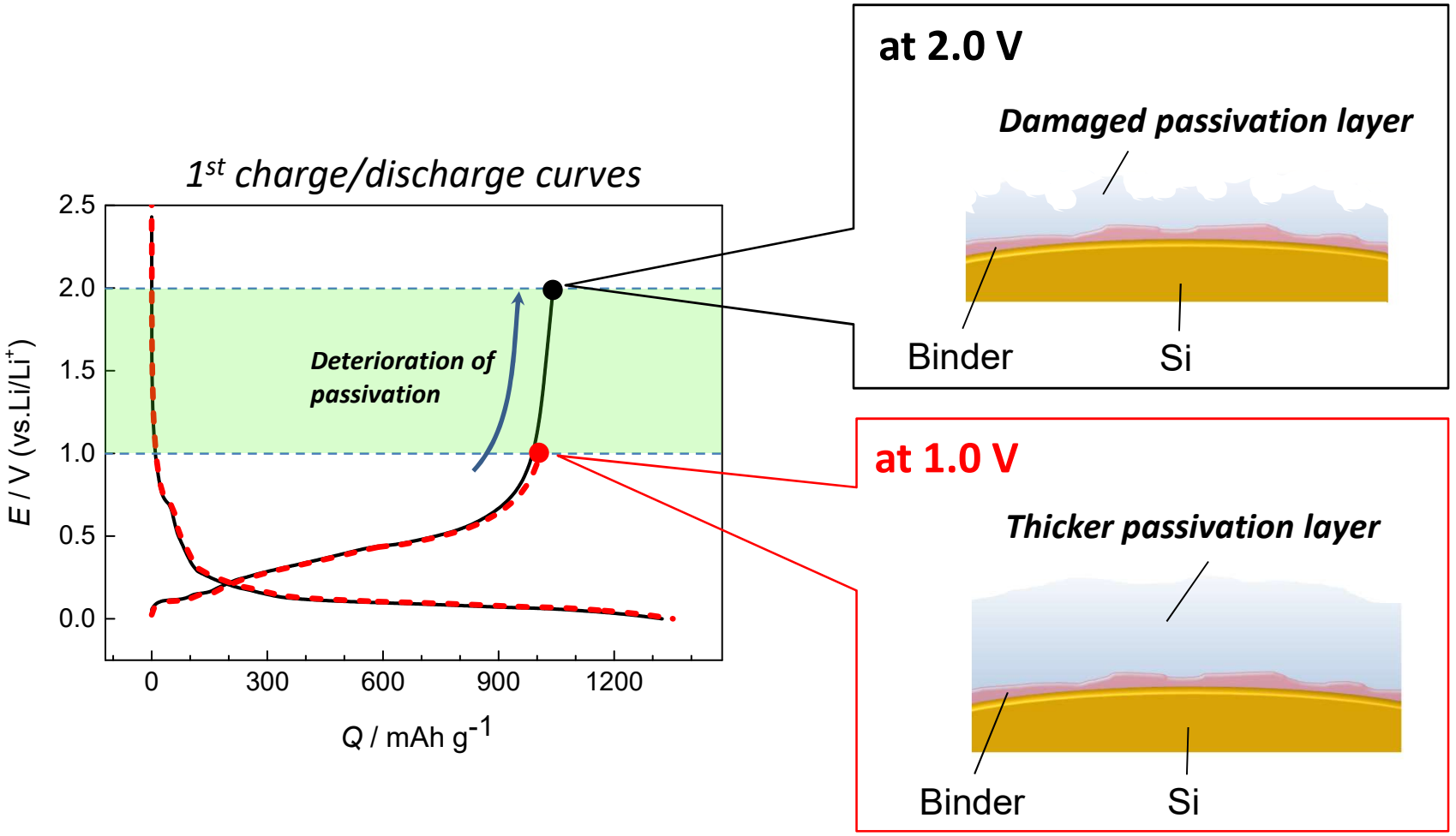


Figure S5 Schematic illustration of anodic damage of SEI surface layer on Si tested under 2.0 V and 1.0 V cut-off conditions for the HAXPES analysis of Figure 11.