

### Supplementary information

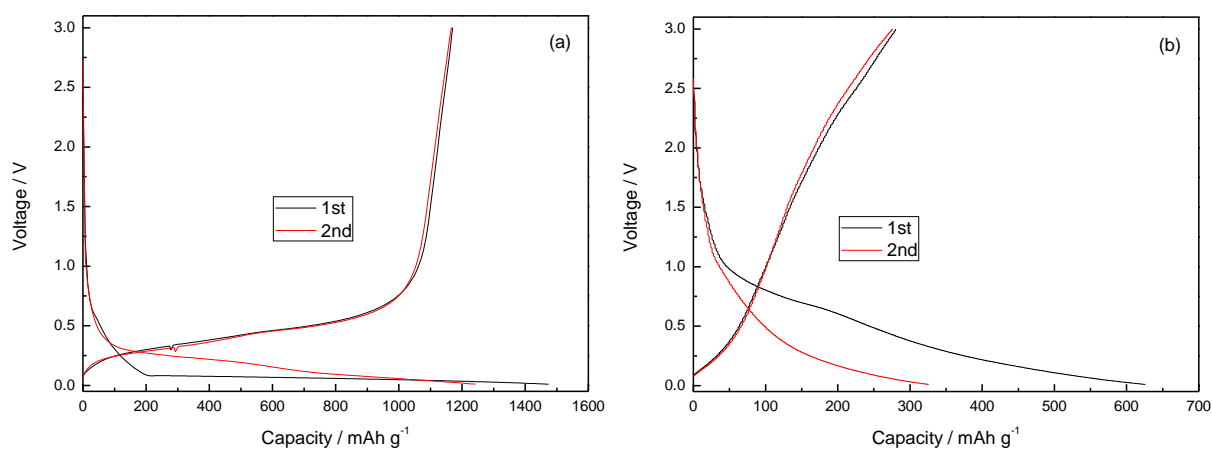


Figure S1. Voltage profiles of the pristine Si (a) and pure graphene (b) electrodes at a current density of 300 mA

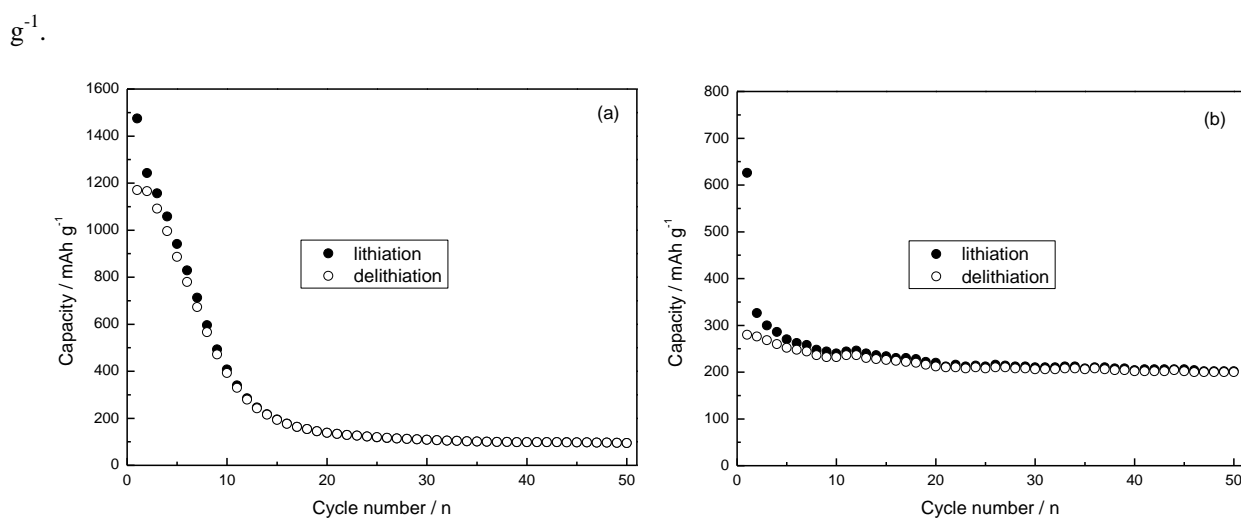


Figure S2. Cycling performance of the pristine Si (a) and pure graphene (b) electrodes at a current density of 300 mA g<sup>-1</sup>.