

Supporting Information

**Low-Volume-Change, Dendrite-Free Lithium Metal Anode Enabled by
Lithophilic 3D Matrix with LiF-Enriched Surface**

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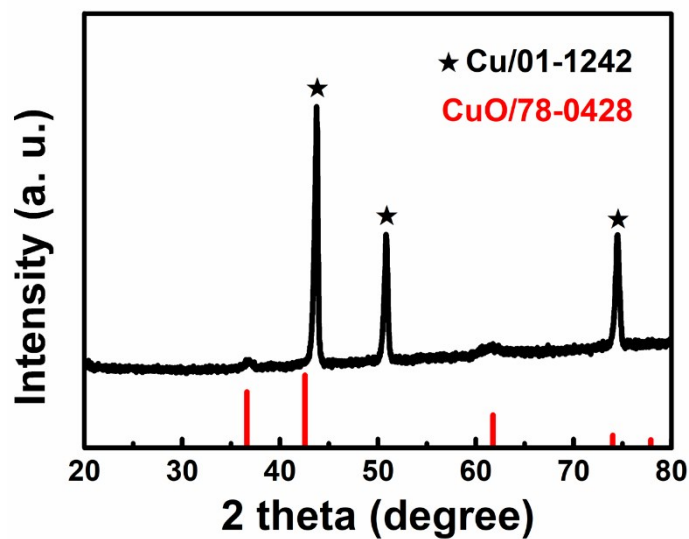


Figure S1. XRD pattern of Oxygen-treated Cu foam.

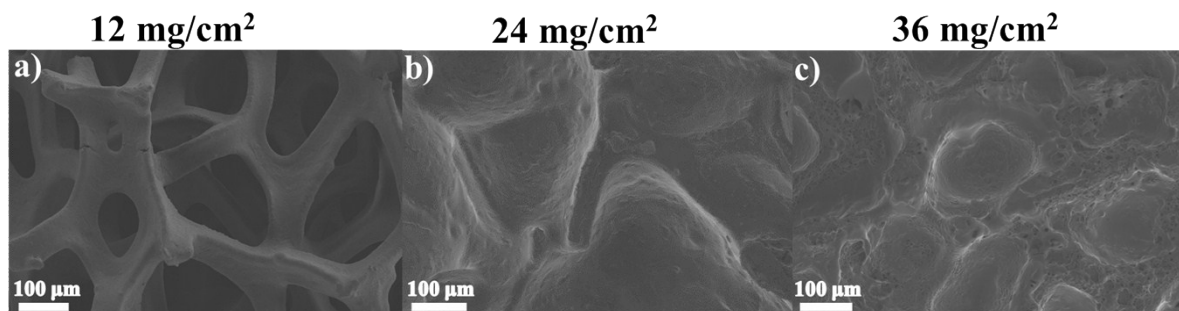


Figure S2. SEM images of Li matrix with different Li areal mass loading from 12 to 36 mg/cm².

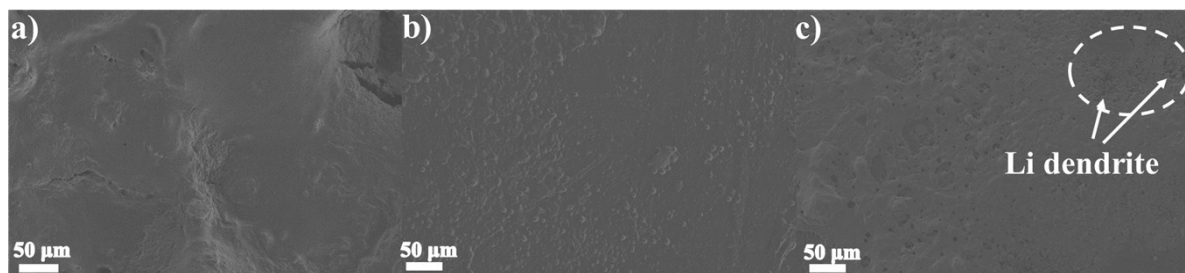


Figure S3. SEM images of Li matrix with various Li mass loading of a) 12 mg/cm², b) 24 mg/cm², c) 36 mg/cm² after plating 20 mAh/cm² of Li metal at the current density of 1 mA/cm².

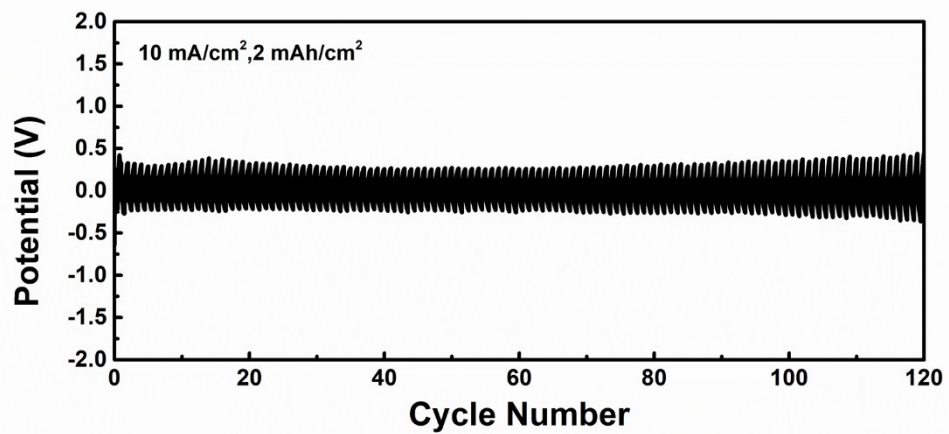


Figure S4. Voltage profile of LiF@Li matrix at the current density of 10 mA/cm² with a cycling capacity of 2 mAh/cm².

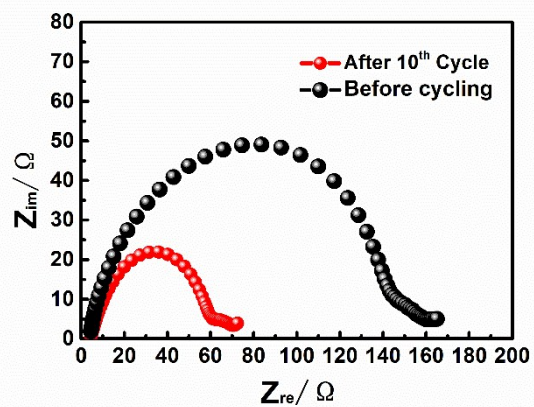


Figure S5. Nyquist plots of Li foil electrode before and after 10th cycle.

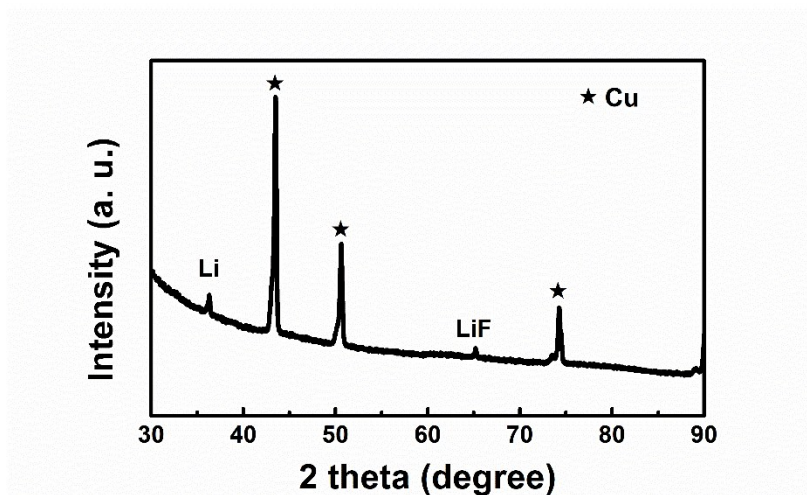


Figure S6. XRD pattern of LiF@Li matrix after 100 cycles at the current density of 1 mA/cm² with the capacity of 1 mAh/cm².

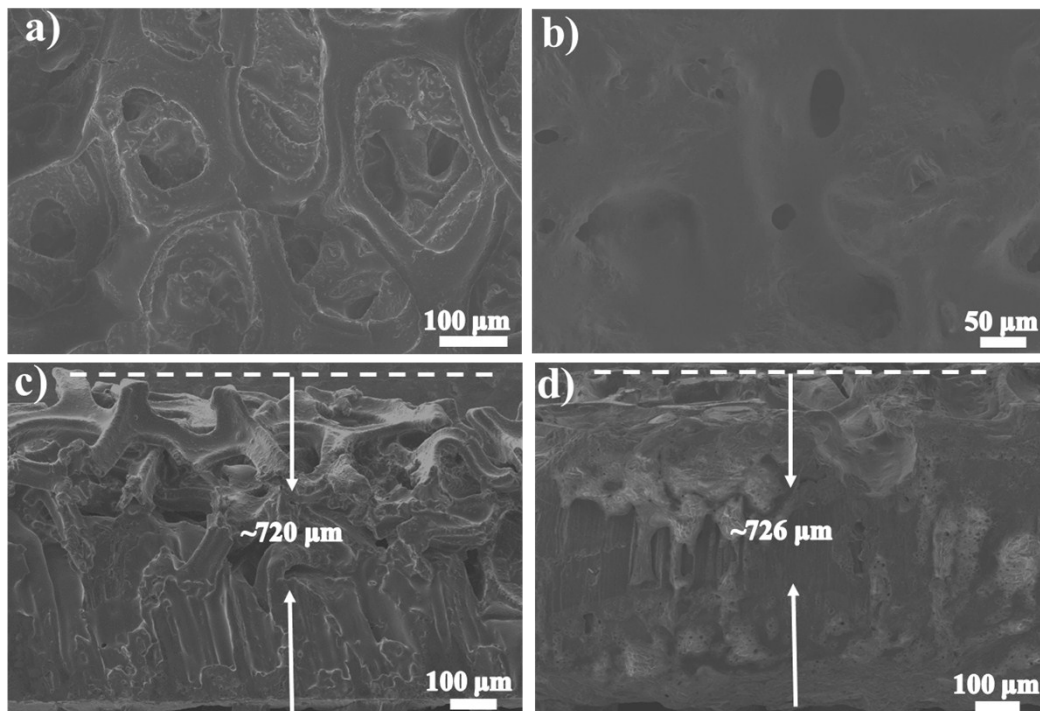


Figure S7. SEM images of LiF@Li matrix a), c) after stripping 40 mAh/cm² of Li and b), d) after stripping and plating back 40 mAh/cm² of Li.

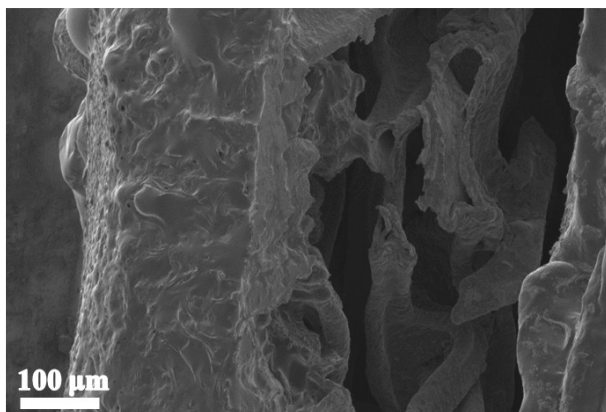


Figure S8. Cross-sectional SEM image of Li matrix after stripping and plating back 40 mAh/cm² of Li.