Supporting Information

A Highly Adhesive Li-BN Nanosheet Composite Anode with Excellent Interfacial Compatibility for Solid State Li Metal Batteries

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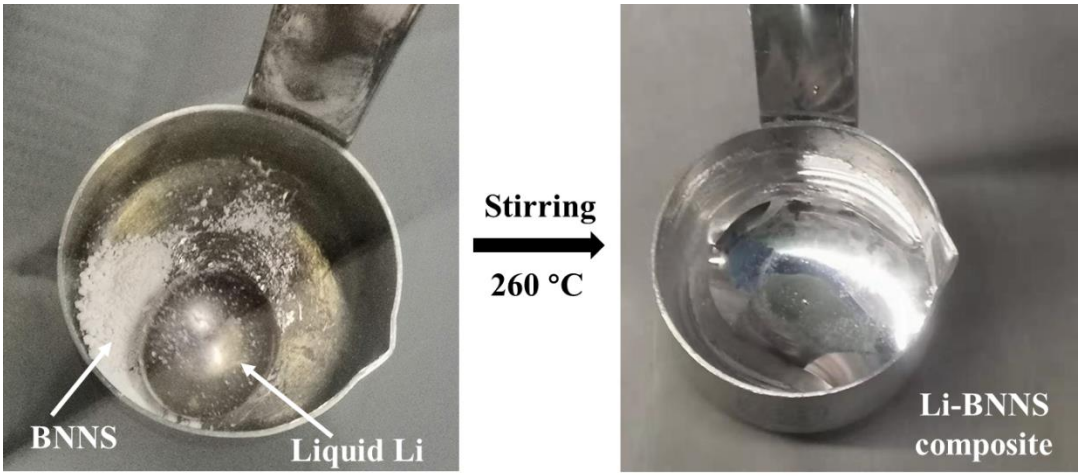

Figure S1. The preparation process of adding BNNS into molten liquid Li in a stainless-steel container under stirring in an Ar-filled glovebox.

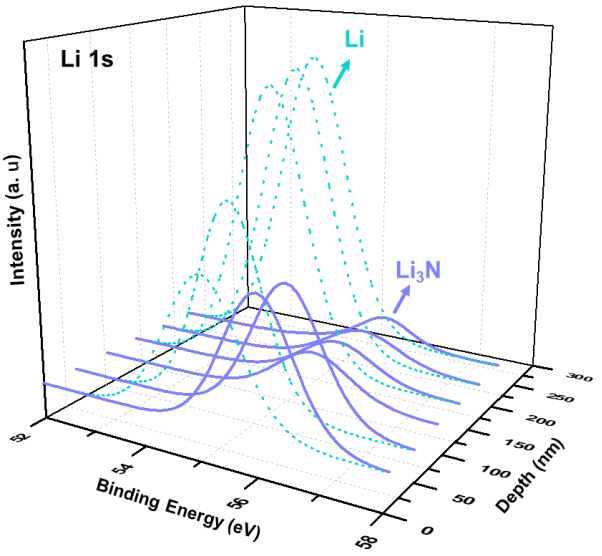

Figure S2. XPS depth profiling of the Li 1s spectra of the Li-BNNS composite.

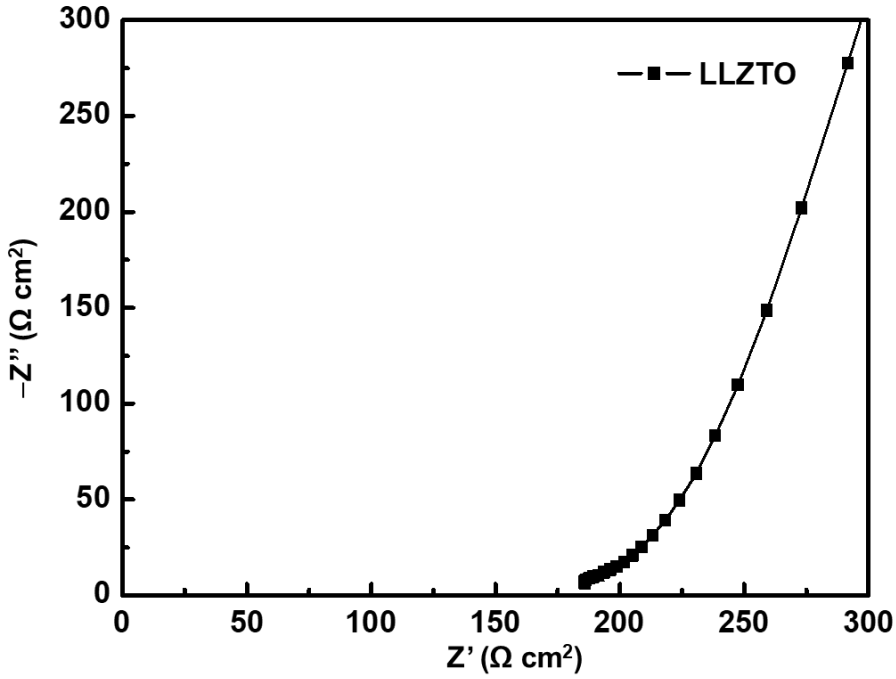

Figure S3. EIS spectrum of the LLZTO pellet at room temperate.

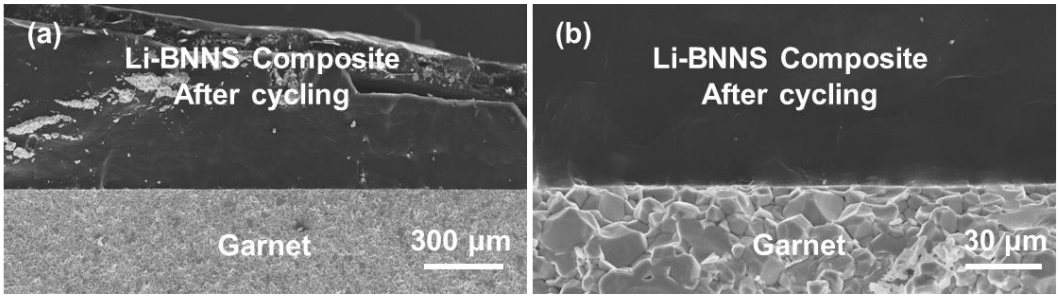

Figure S4. (a, b) Low- and high-magnification SEM images of Li-BNNS|garnet interface after testing at 0.3 mA/cm^2 for 100 cycles.

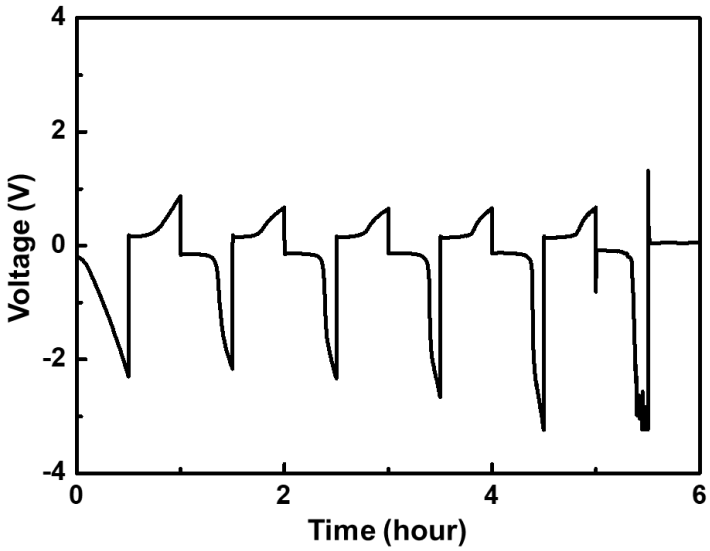

Figure S5. Plating/striping curves of symmetric cells with pure Li electrodes at 0.3 mA/cm^2, room temperature.

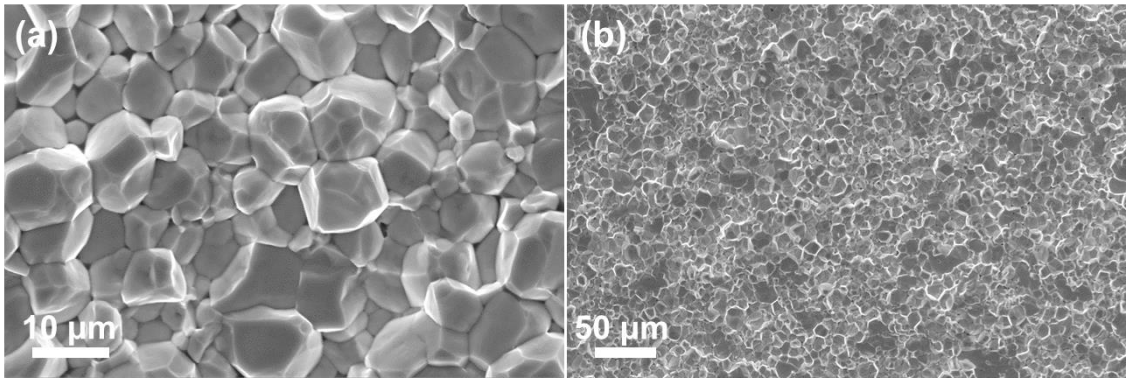

Figure S6. (a, b) SEM images of the LLZTO pellet, showing its dense structure.

Formula	reaction energy (eV/atom)
10/3 Li + BN = Li_3N + 1/3 LiB_3	0.17475
4 Li + BN = Li_3N + LiB	0.138833333
5/2 Li + BN = 1/2 Li_3N + 1/4 LiB_3 + 1/4 Li_3BN_2	0.209055555
8/3 Li + BN = 1/3 Li_3N + 2/3 LiB + 1/3 Li_3BN_2	0.187857141
11/4 Li + BN = 1/2 Li_3N + 1/4 LiB_3 + 1/4 LiB + 1/4 Li_3BN_2	0.188684211
2 Li + BN = 1/2 Li_3N + 1/6LiN_3 + 1/3 LiB_3	0.27325
2 Li + BN = 1/4 Li_3N + 1/4 LiN_3 + LiB	0.268625
12/7 Li + BN = 2/7 Li_3N + 1/7 LiN_3 + 2/7 LiB_3 + 1/7 Li_3BN_2	0.289423077
2 Li + BN = 1/6 Li_3N + 1/6 LiN_3 + 5/6 LiB + 1/6 Li_3BN_2	0.254083333
5/3 Li + BN = 1/6 Li_3N + 1/6 LiN_3 + 1/6 LiB_3 + 1/3 LiB + 1/6 Li_3BN_2	0.2906818180

Table S1. Lithiation reactions for BN. The reaction energy is for the lithiation of BN to form the phase equilibria with Li metal and is normalized to per BN inserted.[1]

[1] The materials formation energy and phase diagram can be found under https://www.materialsproject.org/.

Video S1. Rolling experiments of pure Li and the Li-BNNS composite

Video S2. Molten Li

Video S3. The preparation of Li-BNNS composite contained 1 wt% BNNS

Video S4. The preparation of Li-BNNS composite contained 2 wt% BNNS.

Video S5. The preparation of Li-BNNS composite contained 5 wt% BNNS.