nanomaterials

MDPI

Supporting information

Preparation of Boron Nitride Nanoplatelets via Amino Acid Assisted Ball Milling: Towards Thermal Conductivity Application

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1. X-ray photoelectron spectroscopy (XPS) measurements

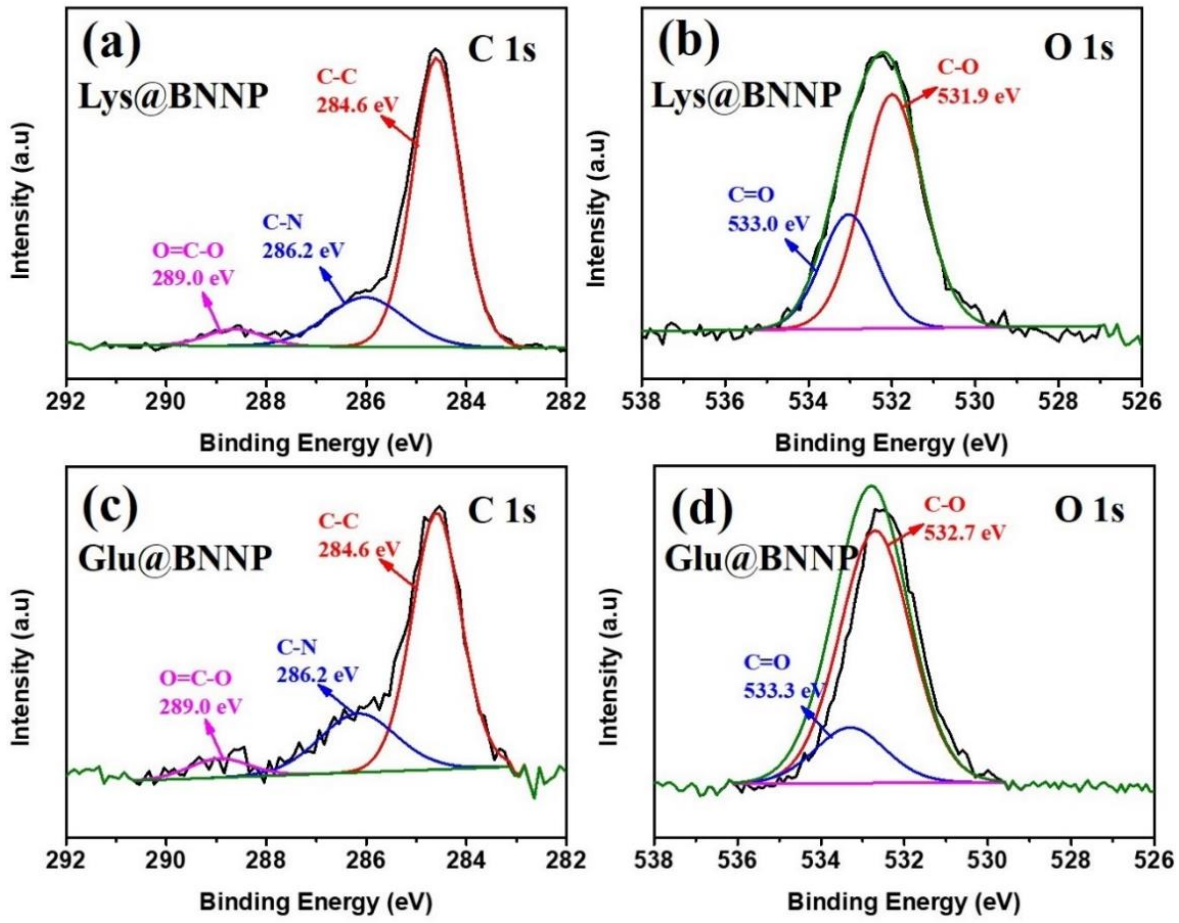

Figure S1. (a)-(b) and (c)-(d) C 1s and O 1s core-level spectra of Lys@BNNP and Glu@BNNP.

2. Transmission electron microscopy

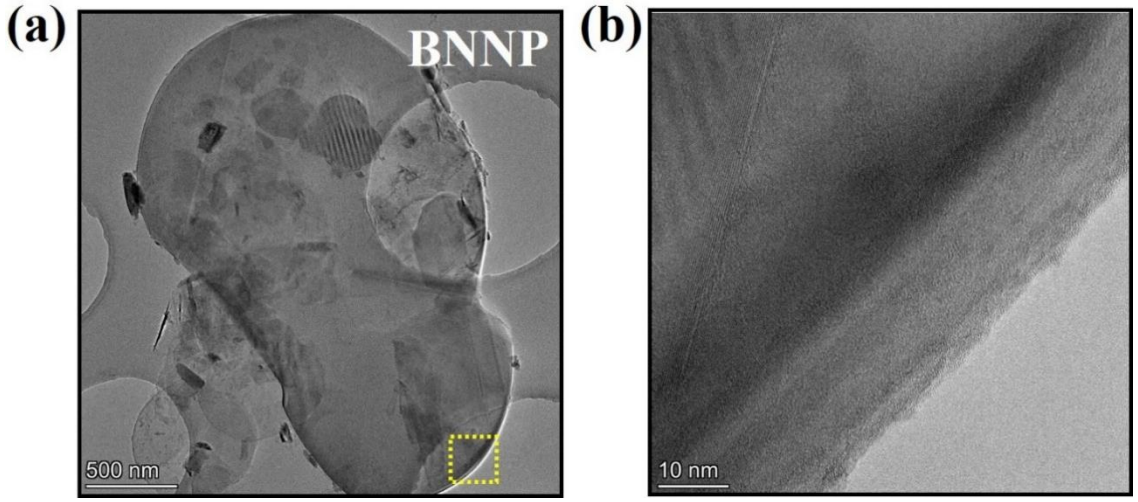

Figure S2. (a) Low-magnification TEM image of BNNP (b) High-resolution TEM images of the BNNP.

3. Raman spectroscopy

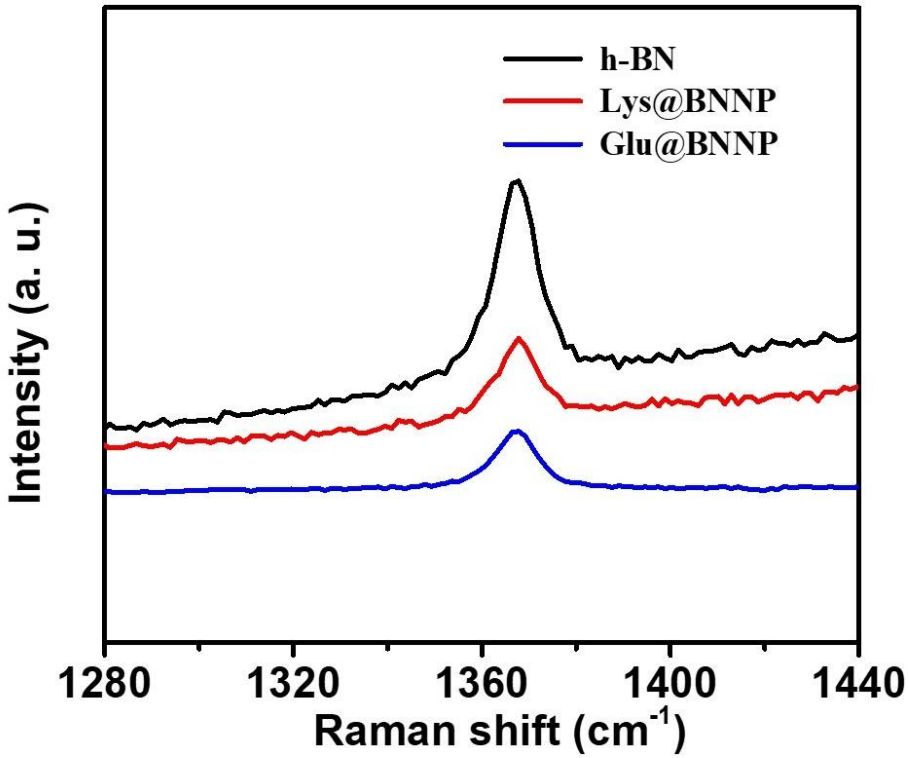

Figure S3. Raman spectroscopy of as-received h-BN, Lys@BNNP and Glu@BNNP.

4. Mechanical properties of BNNP/PVA hydrogels

PVA hydrogel

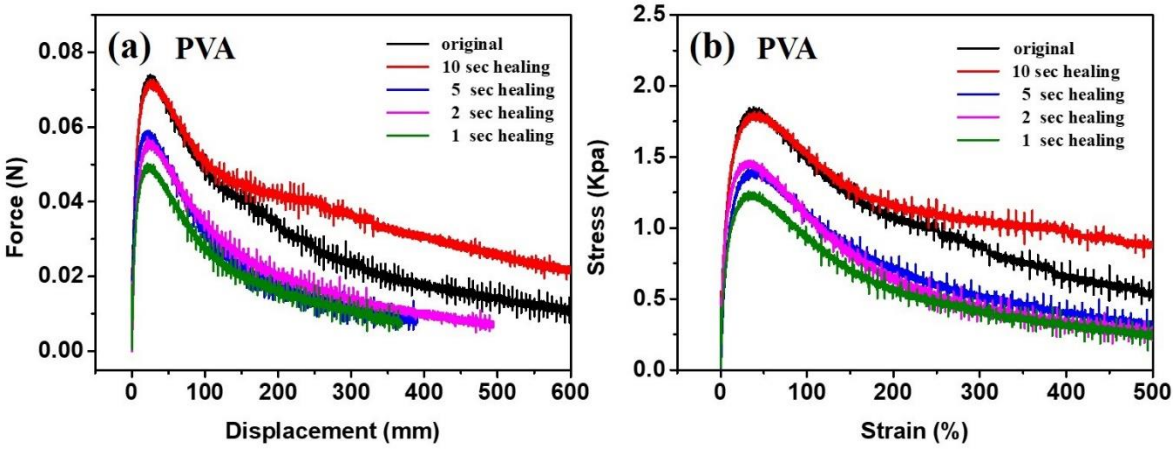

Figure S4. (a) Force-displacement curve of original PVA hydrogel and the healed PVA hydrogels, (b) Tensile stress-strain curve of original PVA hydrogel and the healed PVA hydrogels.

BNNP/PVA hydrogel

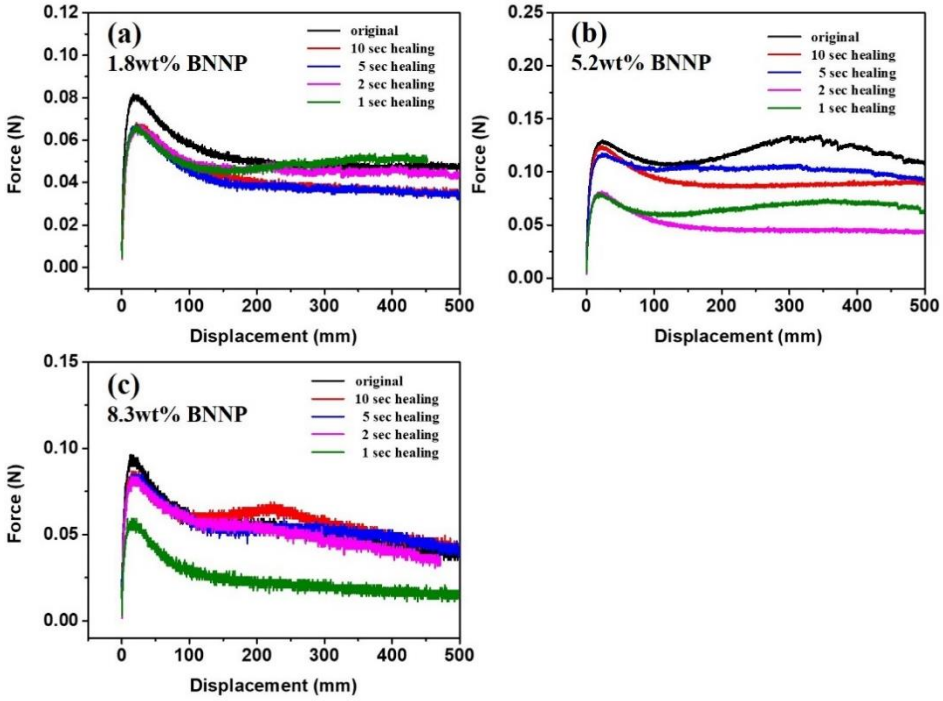

Figure S5. Force-displacement curve of BNNP/PVA hydrogels with different contents of BNNP (1.8, 5.2 and 8.3 wt%), and the healed BNNP/PVA hydrogels (a) 1.8 wt%, (b) 5.2 wt%, (c) 8.3 wt%.

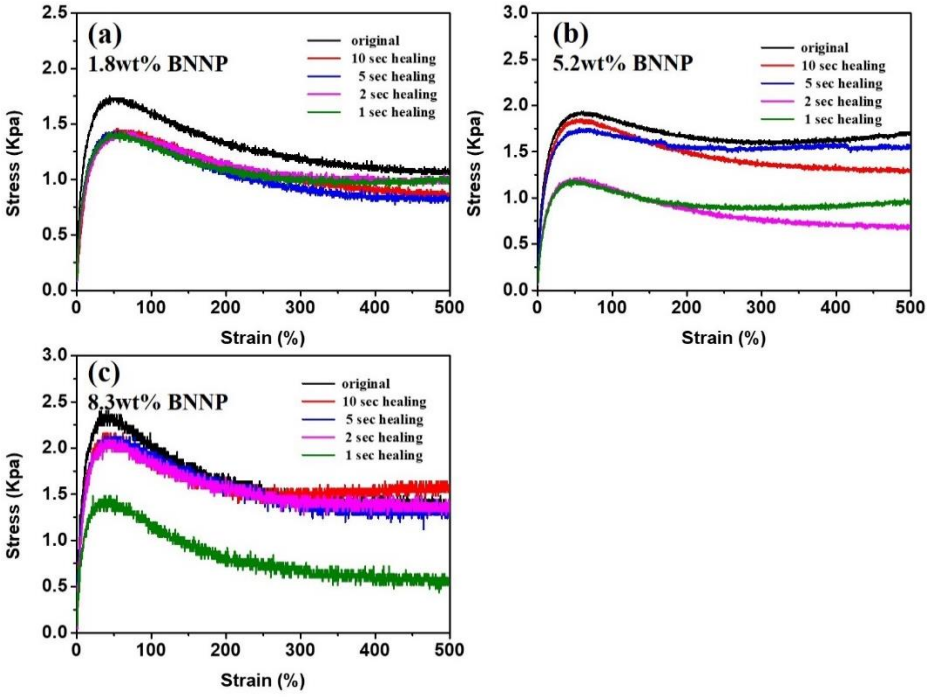

Figure S6. Tensile stress-strain curve of BNNP/PVA hydrogels with different contents of BNNP (1.8, 5.2 and 8.3 wt%), and the healed BNNP/PVA hydrogels (a) 1.8 wt%, (b) 5.2 wt%, (c) 8.3 wt%.

Lys@BNNP/PVA hydrogel

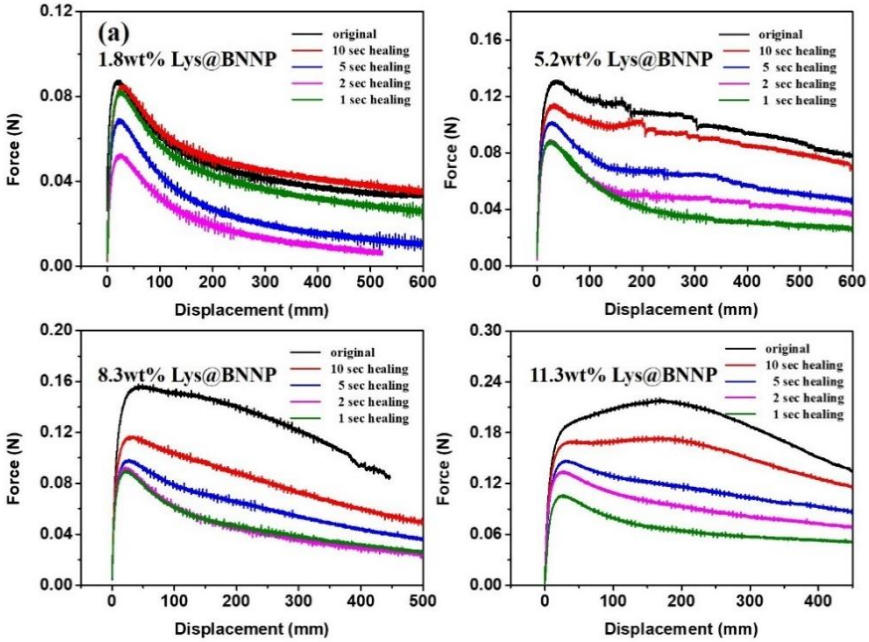

Figure S7. Force-displacement curve of Lys@BNNP/PVA hydrogels with different contents of Lys@BNNP (1.8, 5.2, 8.3 and 11.3 wt%), and the healed Lys@BNNP/PVA hydrogels (a) 1.8 wt%, (b) 5.2 wt%, (c) 8.3 wt% and (d) 11.3 wt%.

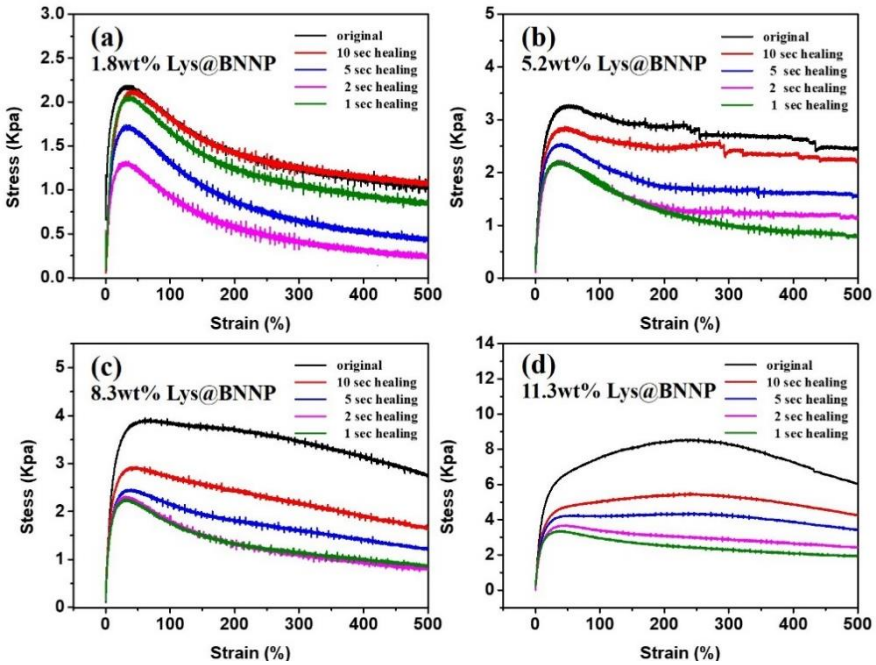

Figure S8. Tensile stress-strain curve of Lys@BNNP/PVA hydrogel with different contents of Lys@BNNP (1.8, 5.2, 8.3 and 11.3 wt%), and the curves of healed Lys@BNNP/PVA hydrogels (a) 1.8 wt%, (b) 5.2 wt %, (c) 8.3 wt% and (d) 11.3 wt%.

Glu@BNNP/PVA hydrogel

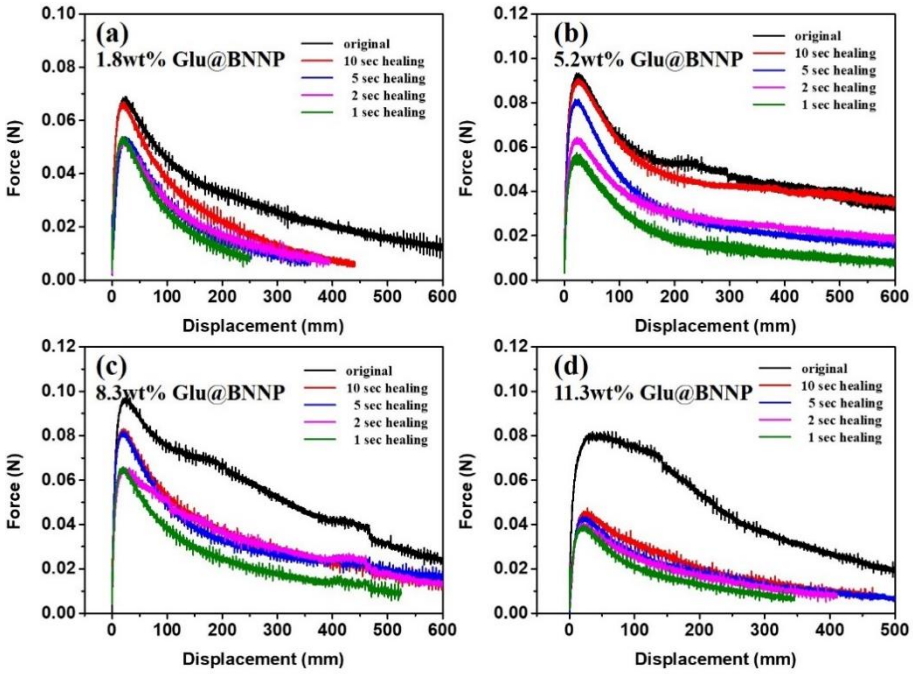

Figure S9. Force-displacement curve of original Glu@BNNP/PVA hydrogel with different contents of Glu@BNNP (1.8, 5.2, 8.3 and 11.3 wt%), and the curves of healed Glu@BNNP/PVA hydrogels (a) 1.8 wt%, (b) 5.2 wt%, (c) 8.3 wt% and (d) 11.3 wt%.

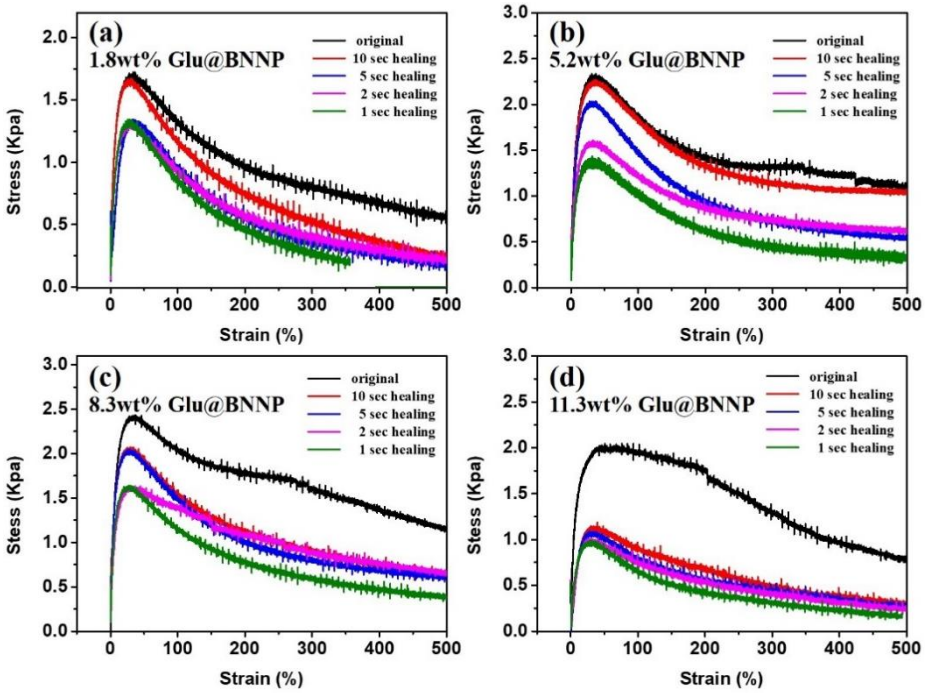

Figure S10. Tensile stress-strain curve of original Glu@BNNP/PVA hydrogel with different contents of Glu@BNNP (1.8, 5.2, 8.3 and 11.3 wt%), and the curves of healed Glu@BNNP/PVA hydrogels (a) 1.8 wt%, (b) 5.2 wt%, (c) 8.3 wt% and (d) 11.3 wt%.

The self-healing test process

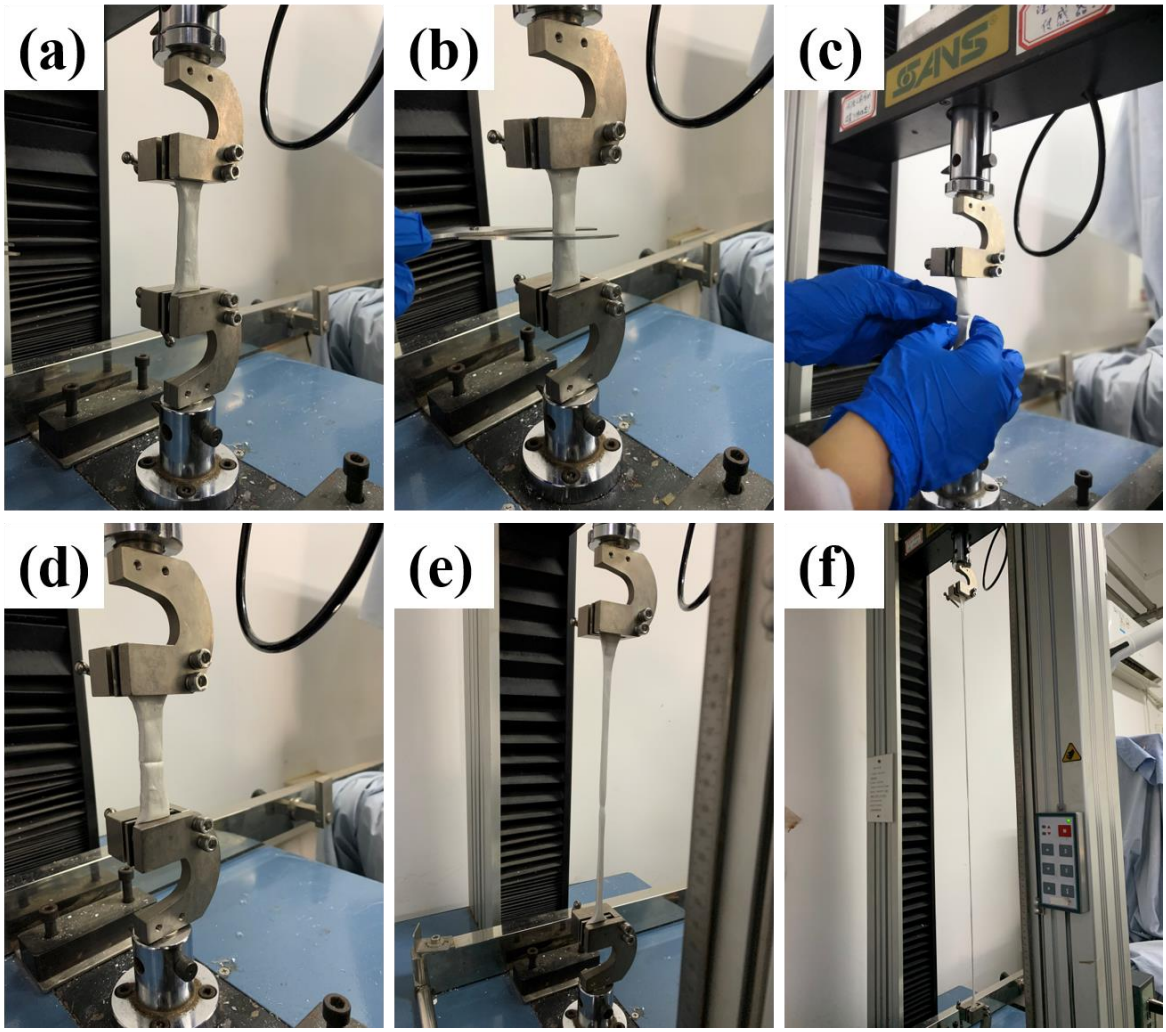

Figure S11. The self-healing test process of Strip-shaped hydrogel samples. In order to test the rapid self-healing performance of the BN samples, self-healing tests were carried out directly on the electronic universal testing machine. (a) Strip-shaped sample was clamped on the testing machine; (b) the hydrogel is cut into two pieces; (c) the two pieces of the hydrogel are re-contacted; (d) the hydrogel can self-heal automatically after contacting for 1 s, 2 s, 5 s or 10 s at room temperature; (e) the healed hydrogel is being tensile tested; and (f) end of healed hydrogel tensile test.