

## *Supporting Information*

# **Sustainable and low-toxicity pyrazolyl *N*-methyliminodiacetic acid boronate as nitrogen-boron flame retardant for functional silk**

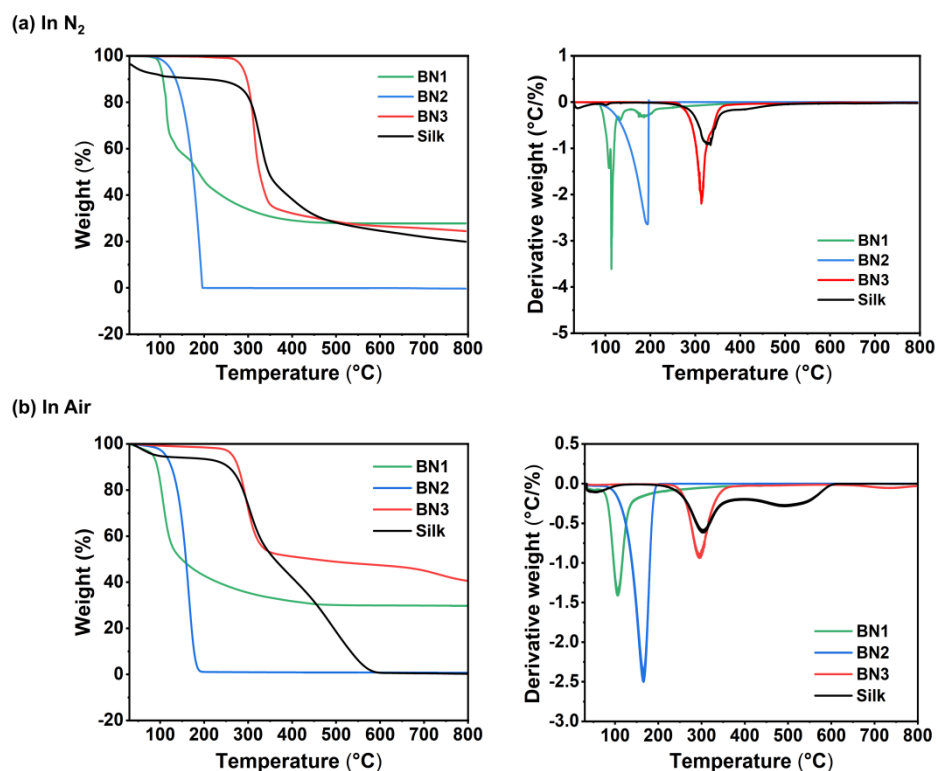
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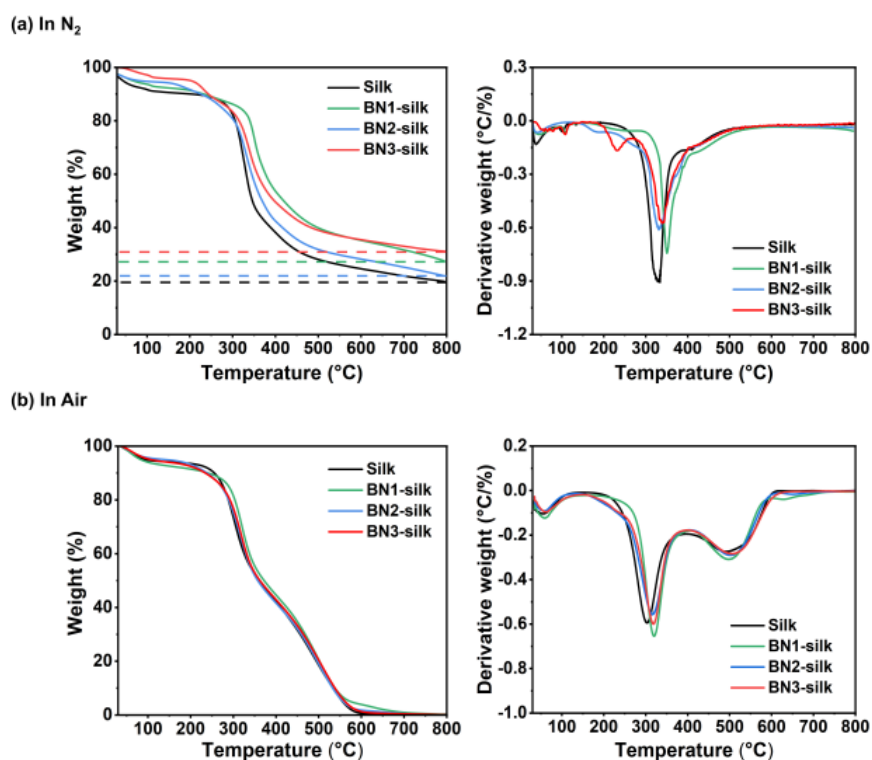
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## **Table of Contents**

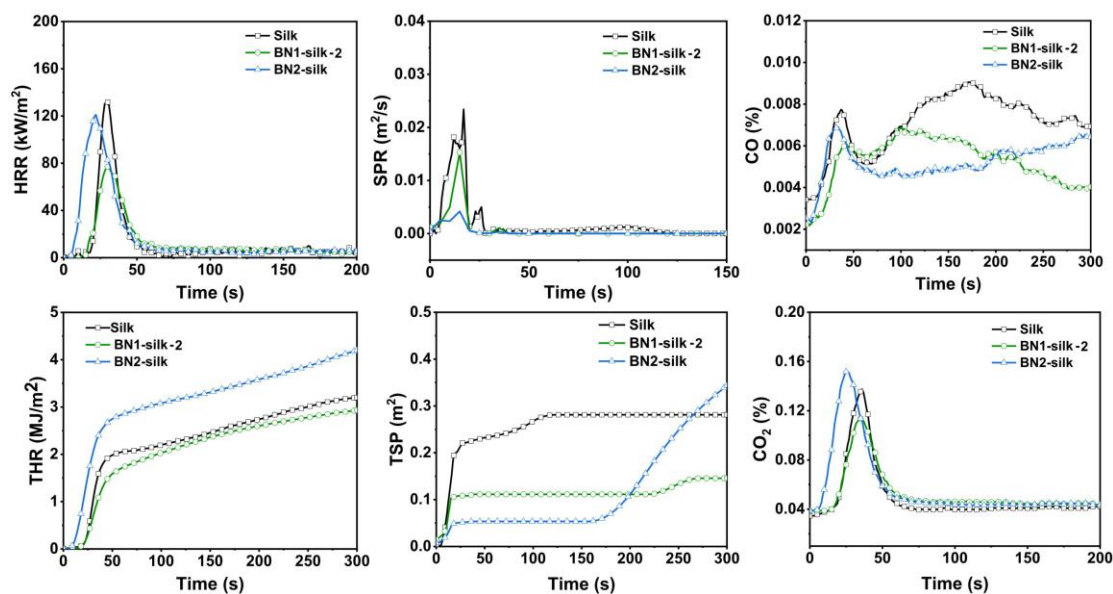
1. TGA and DTG curves of BN1, BN2, BN3, and the neat silk.....	S2
2. TGA and DTG curves of the silk and BN-silks. ....	S2
2. Cone calorimeter data of the neat silk, BN1-silk and BN2-silk.....	S3
3. L929 cells were treated with various concentrations of BN3.....	S3
4. The EDS tests data and images.....	S4
5. FT-IR spectra for the char residue of BN3-silk.....	S4
6. C 1s, O 1s and N 1s XPS spectra of the char residue of BN3-silk.....	S5



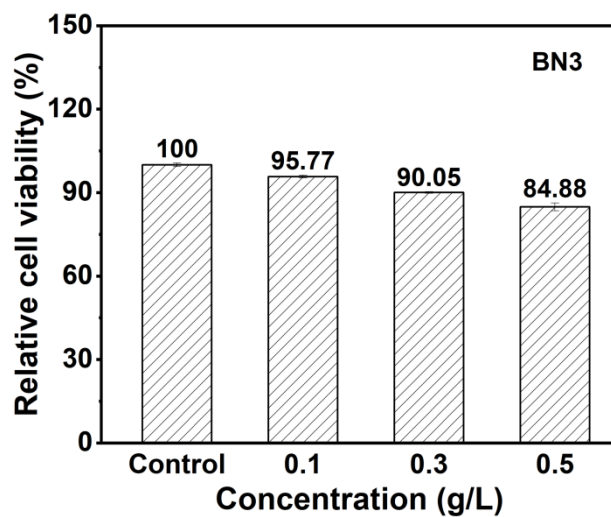
**Fig. S1** TGA and DTG curves of BN1, BN2, BN3, and the neat silk in (a)  $N_2$  and (b) air.



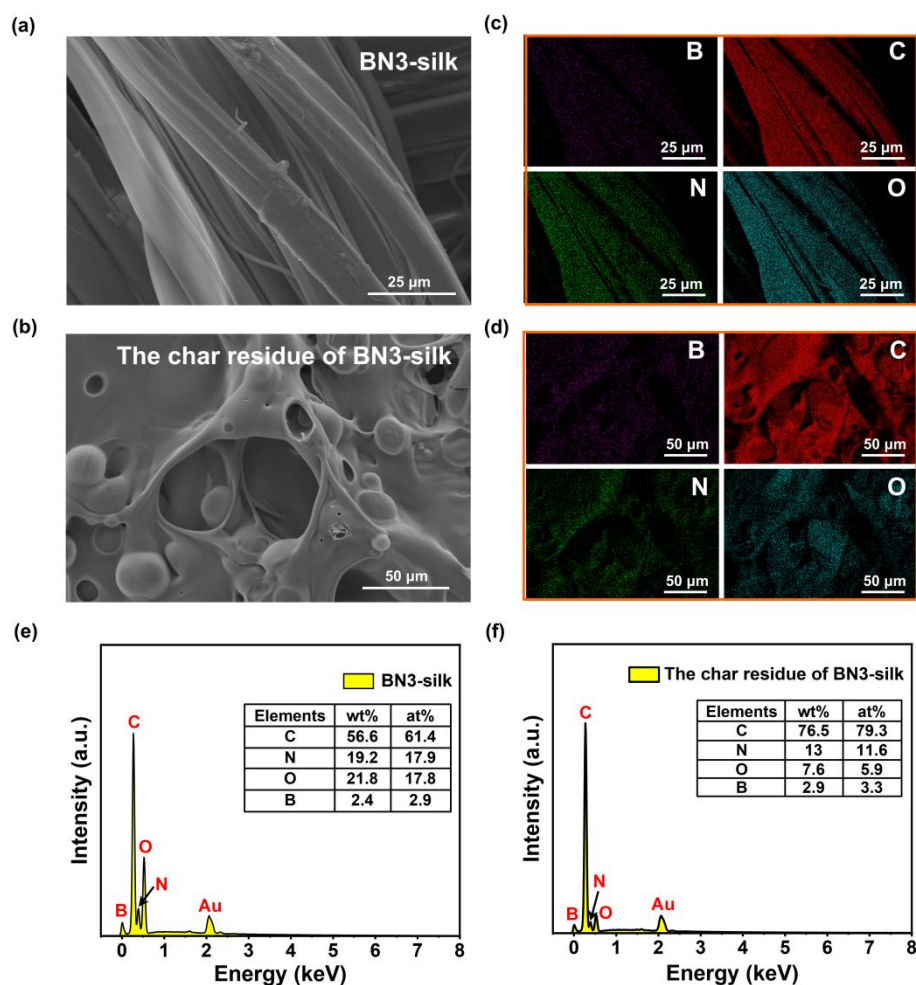
**Fig. S2** TGA and DTG curves of the neat silk and BN-silks in (a)  $N_2$  and (b) air.



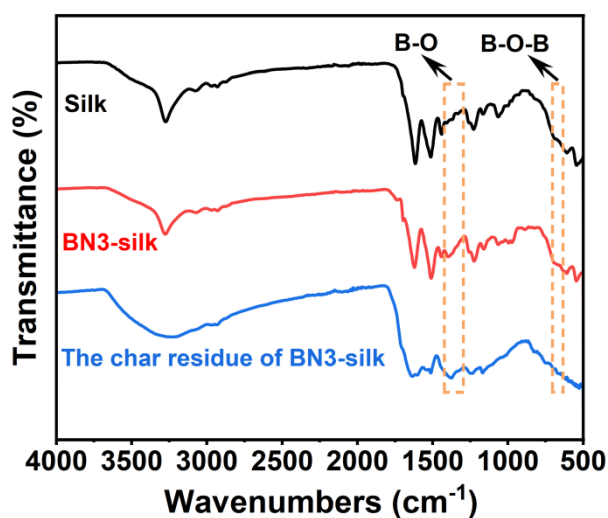
**Fig. S3** Cone calorimeter data of the neat silk, BN1-silk-2 and BN2-silk: (a) HRR curves; (b) THR curves; (c) SPR curves; (d) TSR curves; (e) CO<sub>2</sub> curves; (f) CO curves.



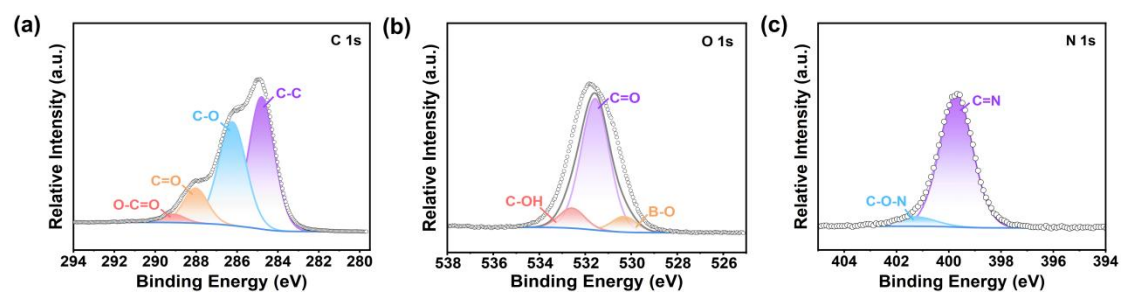
**Fig. S4** L929 cells were treated with various concentrations of BN3 (0, 0.1 g/L, 0.3 g/L, 0.5 g/L).



**Fig. S5** (a) The SEM image of BN3-silk. (b) The SEM image of the char residue for BN3-silk. (c) The EDS mapping of BN3-silk. (d) The EDS mapping of the char residue of BN3-silk. (e) The EDS results of BN3-silk (f) The EDS results of the char residue of BN3-silk



**Fig. S6** FT-IR spectra for the char residue of BN3-silk.



**Fig. S7** (a) C 1s XPS spectra of the char residue of BN3-silk. (b) O 1s XPS spectra of the char residue of BN3-silk. (c) N 1s XPS spectra of the char residue of BN3-silk.