Support Information

Flame-retardancy cellulosic triboelectric materials enabled by hydroxyl ionization

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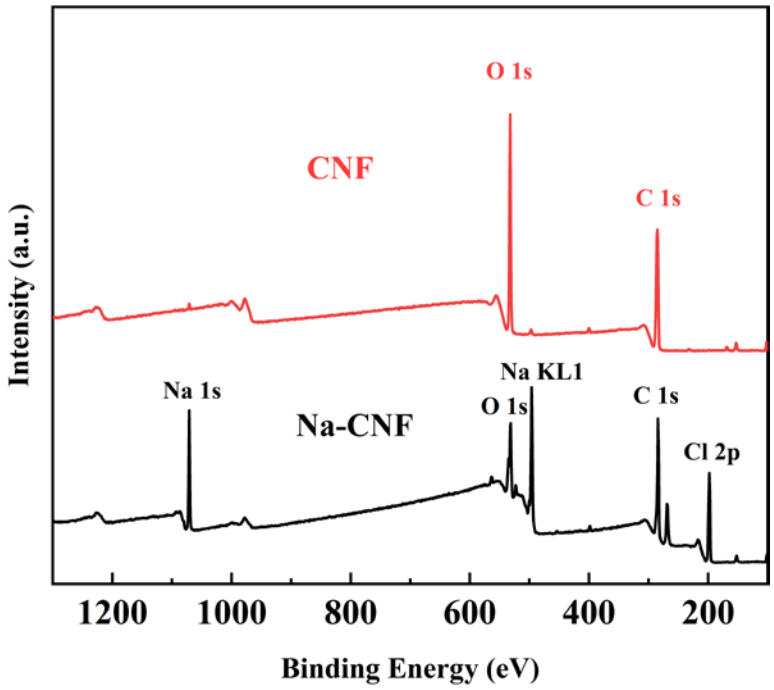

Fig. S1. XPS plots of CNF films and Na-CNF films.

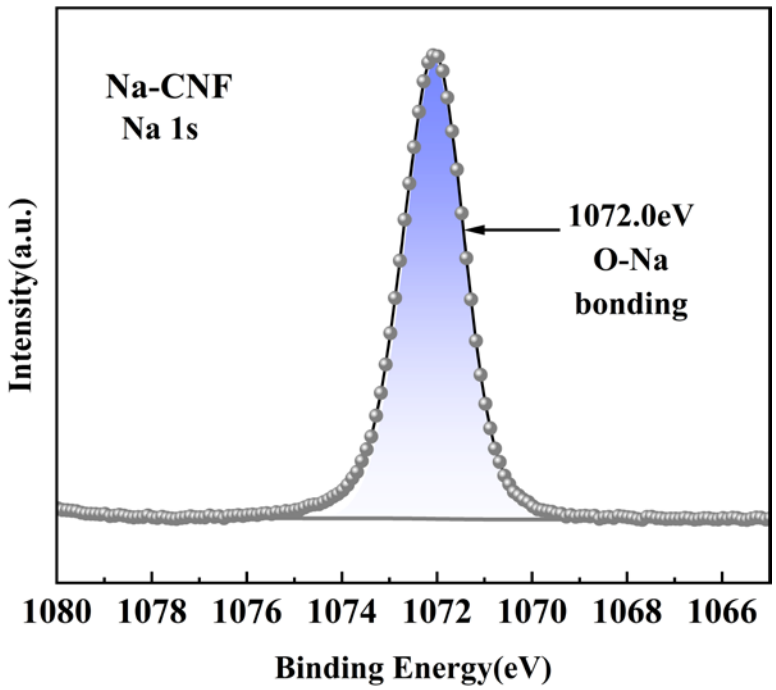

Fig. S2. XPS of Na 1s peak in Na-CNF film.

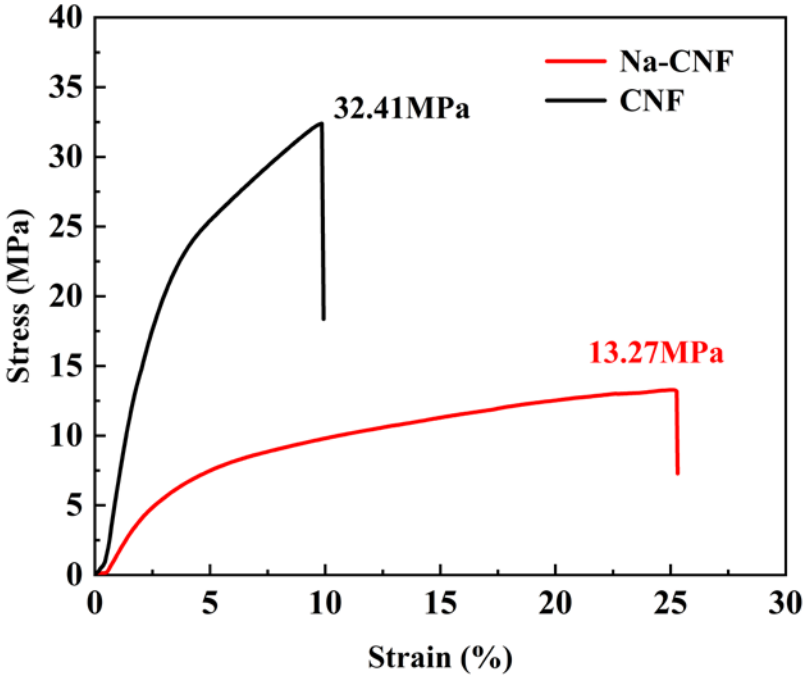

Fig. S3. Elongation at break and tensile strength of Na-CNF and CNF films.

Table S1. Comparison of Na-CNF film LOI in this study with results reported in the literature

Sample	Self-extinguishing	LOI (%)	Ref.
CAP-2	No	29.35	[1]
PVA/CNF/APP4	YES	37.5	[2]
TPMPAT/CNF-30%	YES	32.0	[3]
CS/CNF/APP/BPEI	/	32.7	[4]
BDD/Cellulose	YES	29.0	[5]
TOCN-LDH	YES	31.0	[6]
MHNPs/CNF	/	32.7	[7]
Na-CNF	YES	36.4	This work

Reference

1. Luo X, Shen J, Ma Y, Liu L, Meng R, Yao J, Robust, sustainable cellulose composite aerogels with outstanding flame retardancy and thermal insulation. Carbohydrate Polymers, 2020, 230: 115623
2. Huang Y, Zhou T, He S, Xiao H, Dai H, Yuan B, Chen X, Yang X. Flame-retardant polyvinyl alcohol/cellulose nanofibers hybrid carbon aerogel by freeze drying with ultra-low phosphorus. Applied Surface Science, 2019, 497: 143775
3. Guo W, Chen S, Liang F, Jin L, Ji C, Zhang P, Fei B. Ultra-light-weight, anti-flammable and water-proof cellulosic aerogels for thermal insulation applications. International Journal of Biological Macromolecules, 2023, 246: 125343
4. Chen J, Huang W, Chen Y, Zhou Z, Liu H, Zhang W, Huang J. Facile Preparation of Chitosan-Based Composite Film with Good Mechanical Strength and Flame Retardancy. Polymers, 2022, 14(7)：1337
5. Li N, Ming J, Yuan R, Fan S, Liu L, Li F, Wang X, Yu J, Wu D. Novel Eco-Friendly Flame Retardants Based on Nitrogen–Silicone Schiff Base and Application in Cellulose. ACS Sustainable Chemistry & Engineering, 2019, 8(1)：290-301
6. Wu T, Cai B, Wang J, Zhang C, Shi Z, Yang Q, Hu G.-H, Xiong C. TEMPO-oxidized cellulose nanofibril/layered double hydroxide nanocomposite films with improved hydrophobicity, flame retardancy and mechanical properties. Composites Science and Technology, 2019, 171：111-117
7. Zhao J, Zhang X, Tu R, Lu C, He X, Zhang W. Mechanically robust, flame-retardant and anti-bacterial nanocomposite films comprised of cellulose nanofibrils and magnesium hydroxide nanoplatelets in a regenerated cellulose matrix. Cellulose, 2014, 21(3)：1859-1872