

Electronic Supplementary Information

Polyvinyl alcohol mediated splitting of Kevlar fibers and superior mechanical performances of the subsequently assembled nanopapers

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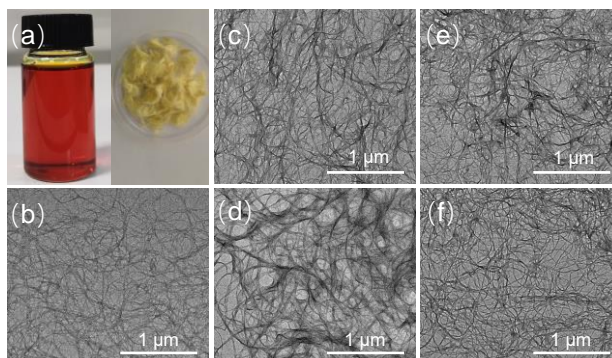


Fig. S1 Optical images of the (a) ANFs/DMSO dispersion and PPTA chopped fibers. TEM images of (b) ANFs, (c) ANFs/PVA-I, (d) ANFs/PVA-II, (e) ANFs/PVA-III and (f) ANFs/PVA-IV.

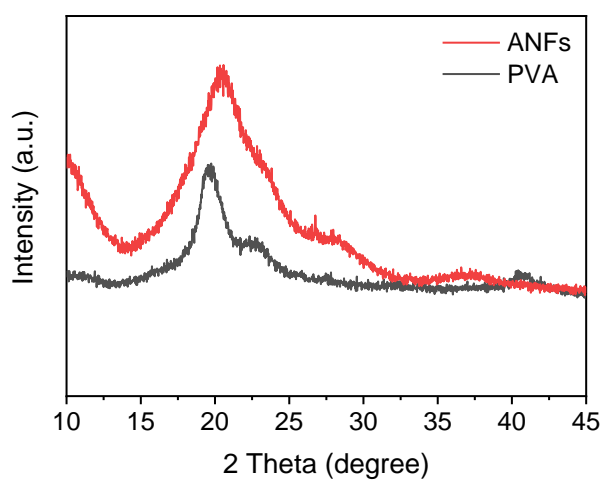


Fig. S2 XRD patterns of pure ANFs (red line) and PVA (black line).

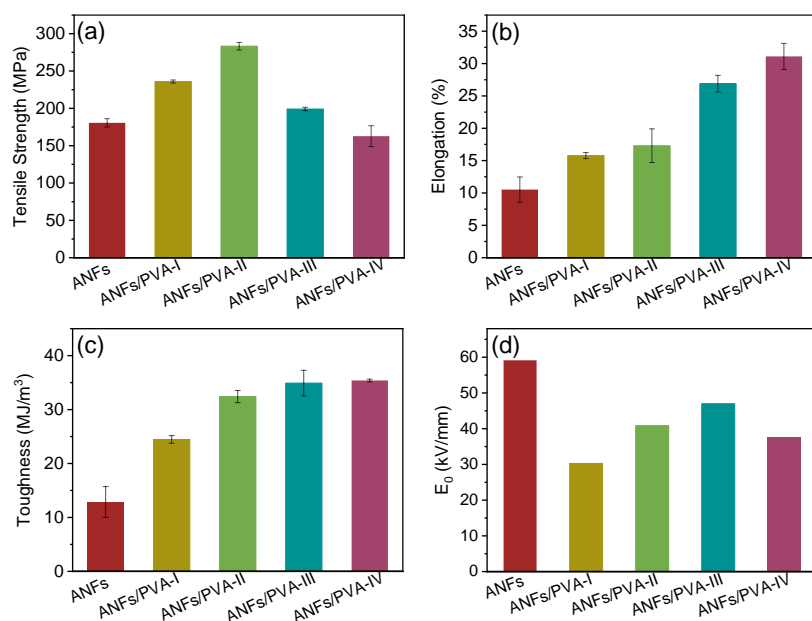


Fig. S3 The (a) tensile strength, (b) elongation, (c) toughness, and (d) dielectric breakdown strength of the ANFs and ANFs/PVA composites.

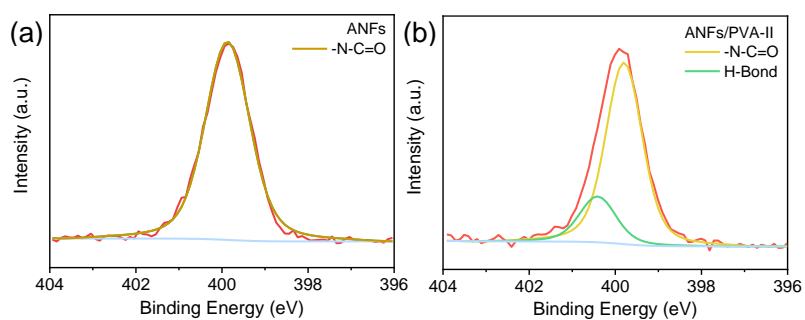


Fig. S4 N1s XPS surveys of (a) ANFs and (b) ANFs/PVA-II.

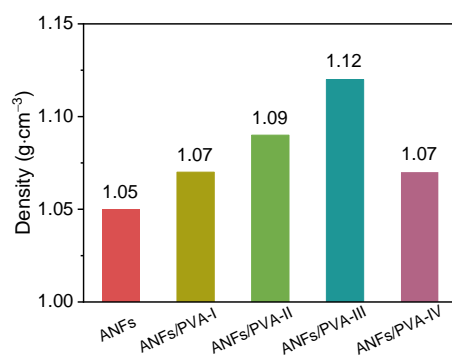


Fig. S5 Densities of ANFs and ANFs/PVA composites evaluated by measuring the weights and volumes.

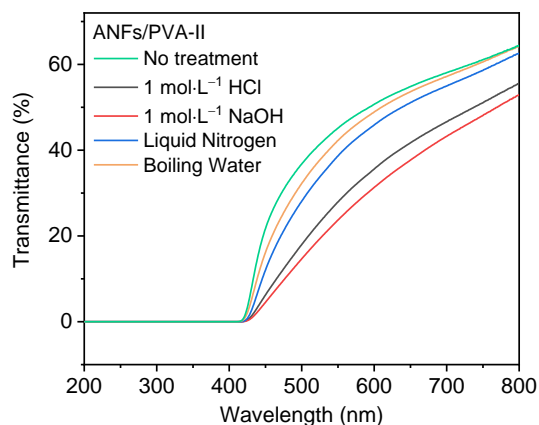


Fig. S6 Typical UV-vis transmission spectra of ANFs/PVA-II after soaking in 1 mol·L⁻¹ HCl, 1 mol·L⁻¹ NaOH, liquid nitrogen, and boiling water for 24 h.

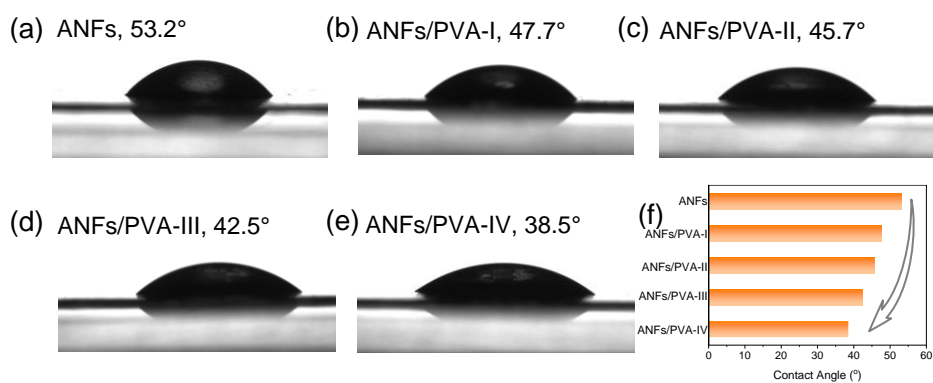


Fig. S7 Water contact angles (WCAs) of (a) ANFs, (b) ANFs/PVA-I, (c) ANFs/PVA-II, (d) ANFs/PVA-III, (e) ANFs/PVA-IV, and (f) the histograms of WCAs for all samples.

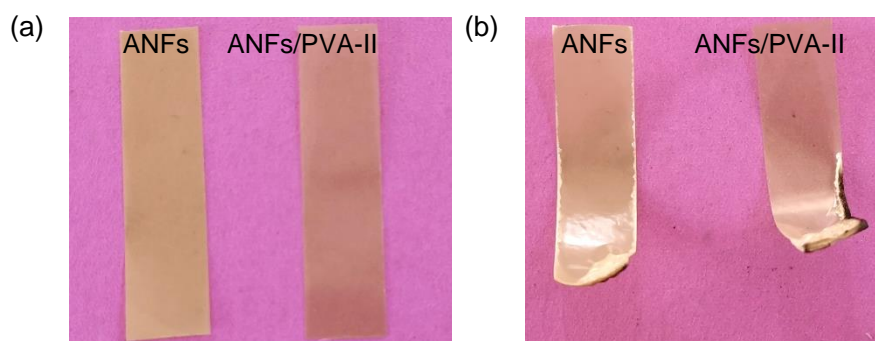


Fig. S8 Optical images of ANFs and ANFs/PVA-II papers (a) before and (b) after combustion.

Table S1 Detailed binding energies and atomic ratios of O1s for ANFs and ANFs/PVA-II paper.

Samples	C=O		C-OH	
	Binding energy (eV)	Atomic ratio (%)	Binding energy (eV)	Atomic ratio (%)
ANFs	531.2	60.77	532.6	39.23
ANFs/PVA-II	531.2	41.57	532.2	58.43

Table S2 Detailed tensile strength, toughness, and strain at break of the ANFs and ANFs/PVA papers.

Samples	Tensile Strength (MPa)	Toughness (MJ·m ⁻³)	Elongation (%)
ANFs	180.51±5.54	12.86±2.86	10.51±1.96
ANFs/PVA-I	235.88±2.06	24.46±0.70	15.77±0.47
ANFs/PVA-II	283.25±5.09	32.41±1.13	17.3±2.60
ANFs/PVA-III	199.07±2.30	34.91±2.37	26.90±1.27
ANFs/PVA-IV	162.68±14.00	35.40±0.25	31.10±2.02