

Supporting Information

Modified Halloysite Nanotubes filled Polyimide Composites for Film Capacitors: High Dielectric Constant, Low Dielectric Loss and Excellent Heat Resistance

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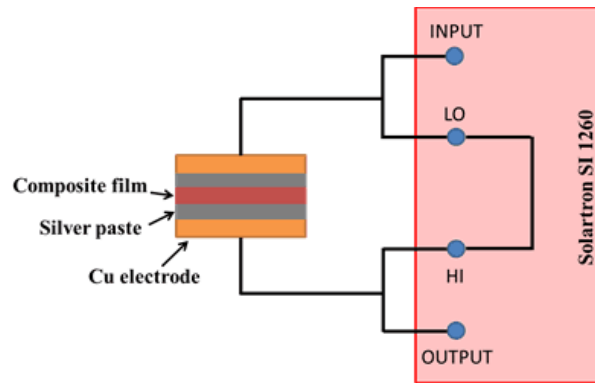


Fig. S1 Detailed procedure to fabricate film capacitors for testing dielectric properties.

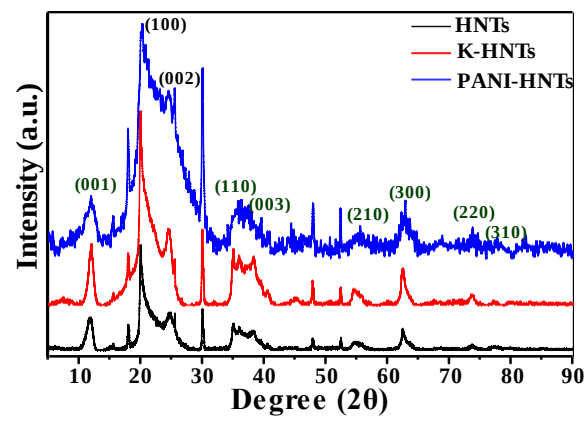


Fig. S2 XRD patterns of HNTs, K-HNTs and PANI-HNTs.

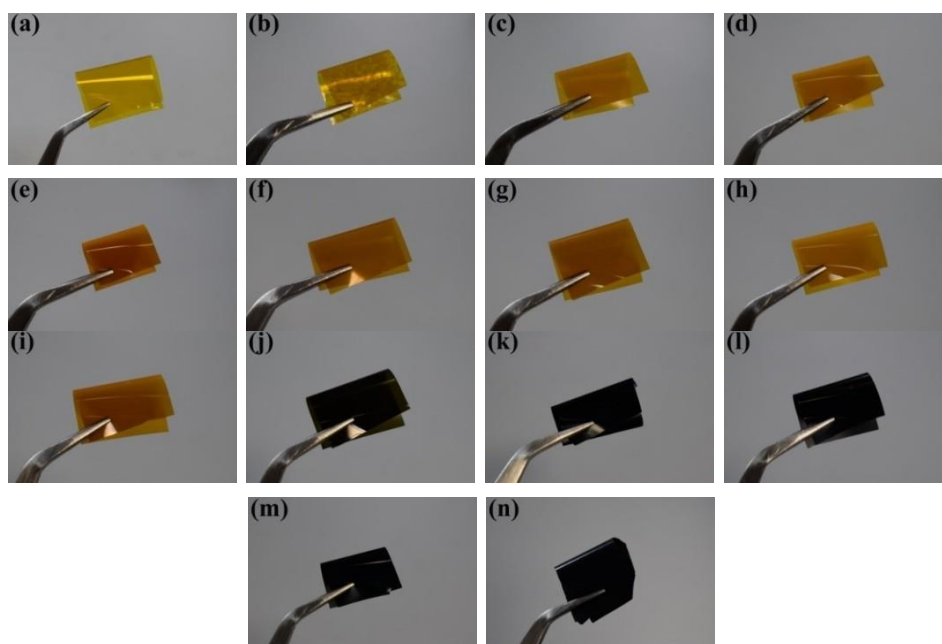


Fig. S3 Photographs of (a) pure PI; HNTs/PI composite films: (b) 10mt%, (c) 20mt%, (d) 30mt%, (e) 40mt%; K-HNTs/PI composite films: (f) 10mt%, (g) 20mt%, (h) 30mt%, (i) 40mt% and PANI-HNTs/PI composite films: (j) 10mt%, (k) 20mt%, (l) 30mt%, (m) 40mt%, (n) 50mt%.

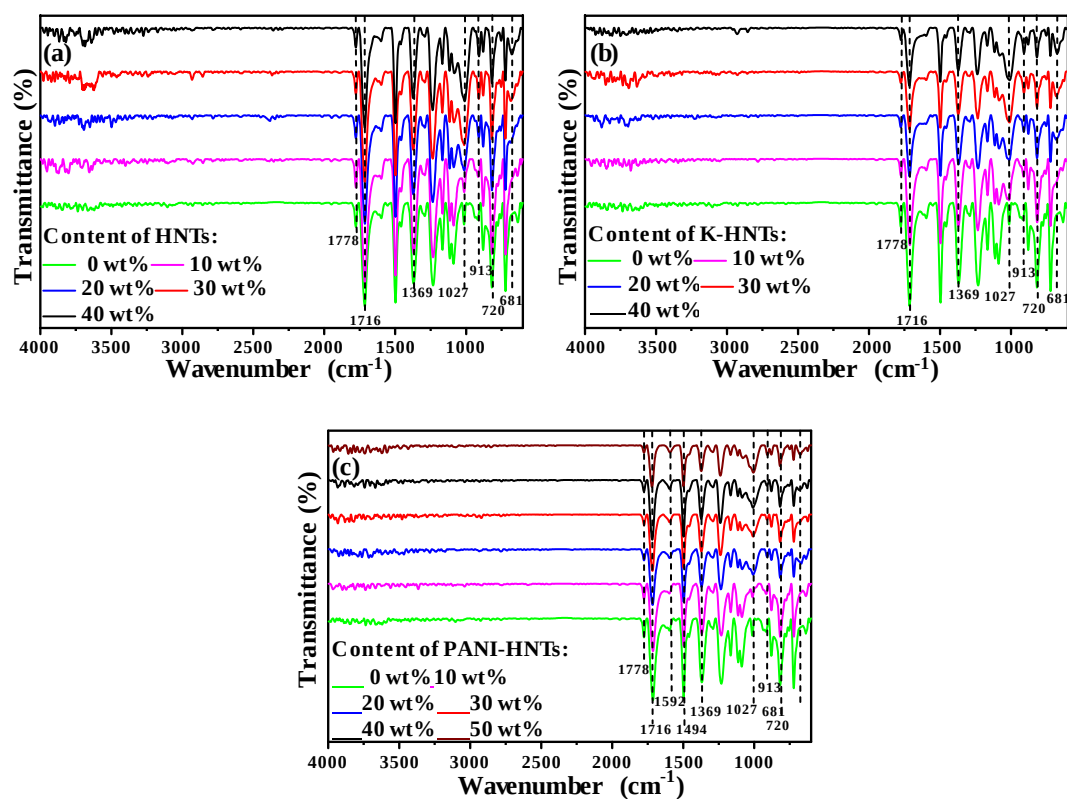


Fig. S4 FT-IR spectra of (a) HNTs/PI, (b) K-HNTs/PI and (c) PANI-HNTs/PI composite films.

Table S1 The thermal properties of composite films with varied mass fractions.

Sample	$T_{d5\%}$ ($^{\circ}\text{C}$)	$T_{d10\%}$ ($^{\circ}\text{C}$)	Sample	$T_{d5\%}$ ($^{\circ}\text{C}$)	$T_{d10\%}$ ($^{\circ}\text{C}$)
Pure PI	665	683	30 wt% K-HNTs/PI	592	681
10 wt% HNTs/PI	659	697	40 wt% K-HNTs/PI	587	684
20 wt% HNTs/PI	612	686	10 wt% PANI-HNTs/PI	668	703
30 wt% HNTs/PI	609	685	20 wt% PANI-HNTs/PI	570	687
40 wt% HNTs/PI	612	684	30 wt% PANI-HNTs/PI	595	686
10 wt% K-HNTs/PI	659	698	40 wt% PANI-HNTs/PI	538	674
20 wt% K-HNTs/PI	596	687	50 wt% PANI-HNTs/PI	535	653

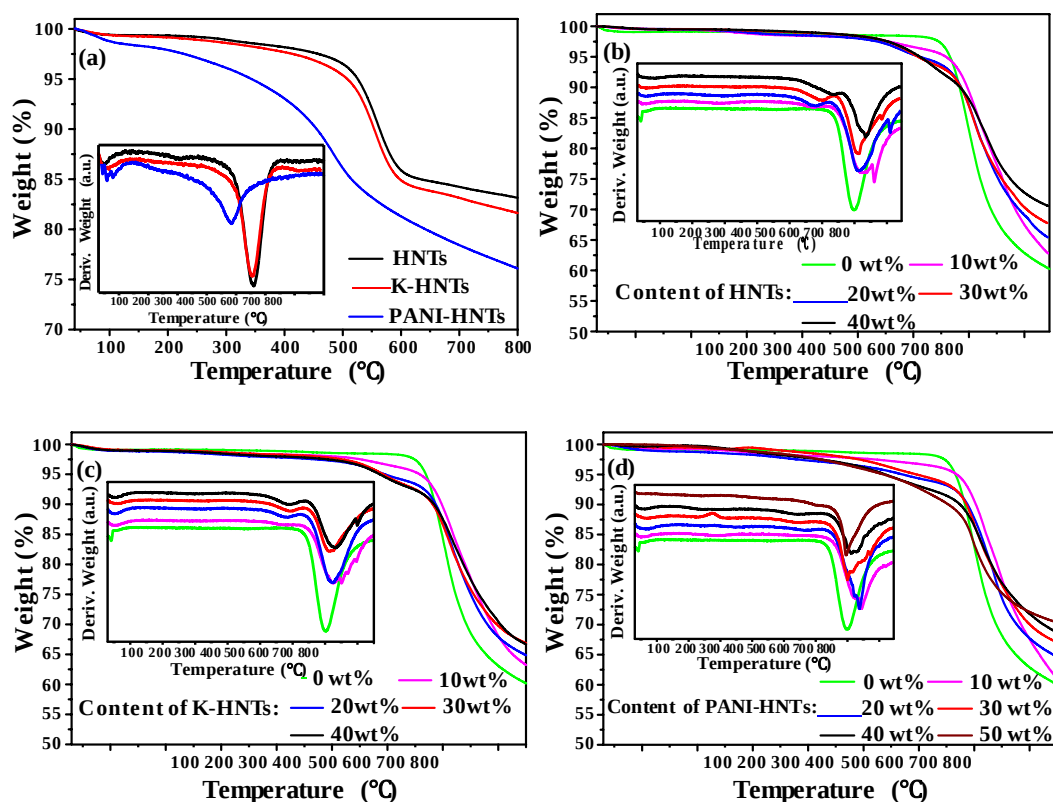


Fig. S5 TGA and DTG curves (inset) of (a) fillers; (b) HNTs/PI, (c) K-HNTs/PI and (d) PANI-HNTs/PI composite films.

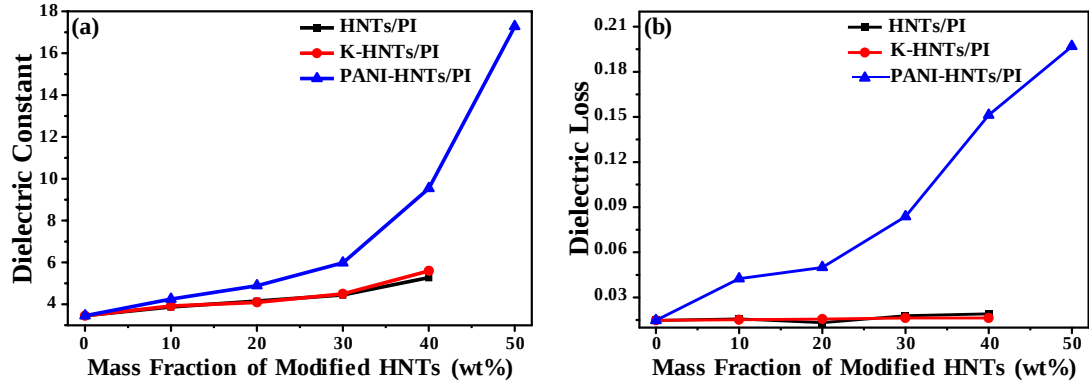


Fig. S6 (a) The dielectric constant and (b) dielectric loss ($\tan \delta$) of HNTs/PI, K-HNTs/PI and PANI-HNTs/PI composite films measured at room temperature (100 Hz).

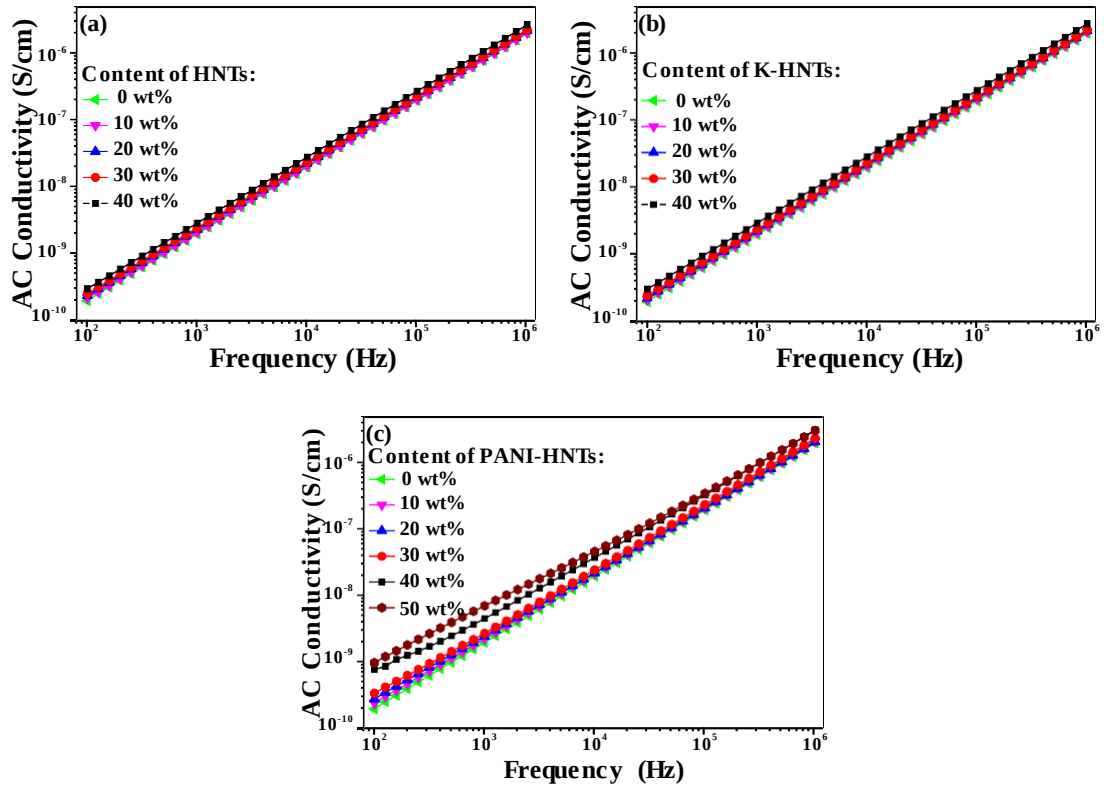


Fig. S7 The AC conductivity of (a) HNTs/PI, (b) K-HNTs/PI and (c) PANI-HNTs/PI composite films.