Influence of H-Bonding on the Crystalline Structures, Ferroelectric and Piezoelectric Properties of Novel Nanogenerators of Lithium Salt of 6-Amino Hexanoic Acid Incorporated Poly(vinylidene fluoride) Composites

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Supplemantary Information

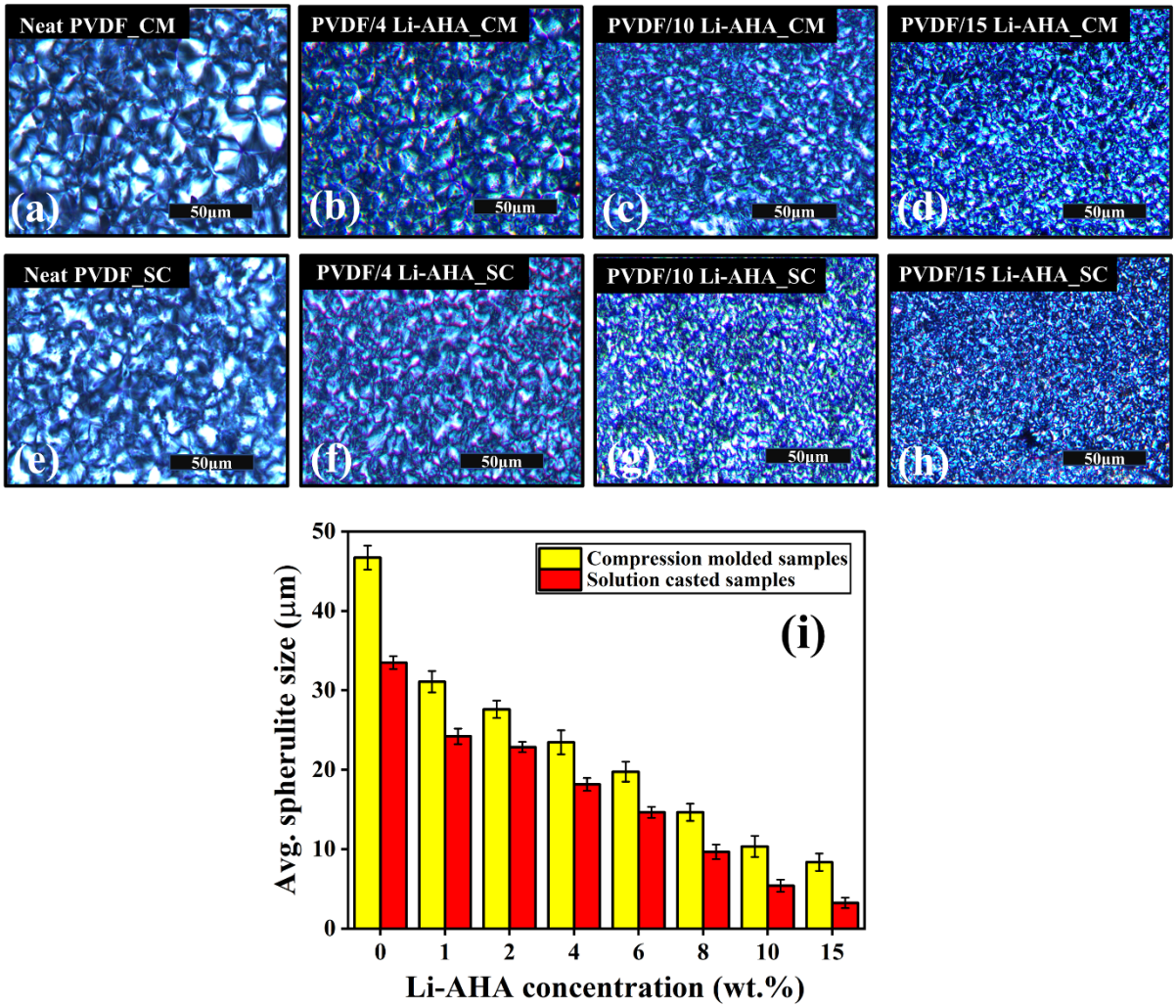

Figure S1 Polarised optical microscopic images of compression moulded and solution casted films of (a, c) neat PVDF, (b, f) PVDF/Li-AHA nanocomposite of 4 wt.% Li-AHA, (c, g) PVDF/Li-AHA nanocomposite of 10 wt.% Li-AHA, (d, h) PVDF/Li-AHA nanocomposite of 15 wt.% Li-AHA respectively and (i) variation of average spherulite size with varying Li-AHA concentration in compression moulded and solution casted PDF/Li-AHA composites.

The spherulite sizes for each of the compression moulded and solution casted samples was measured (ImageJ software) several times to get average value of each set of data was calculated.

From the obtained values, the standard error for aforementioned parameters was calculated for each of the samples, in the following manner:

Step 1: Average of the data, $$P_{avg} = \frac{1}{n}\sum_{i=1}^{n} P_i$$

Step 2: Variance, $$S^2 = \frac{1}{n-1}\sum_{i=1}^{n} P_i - P_{avg}$$

Step 3: Standard Deviation, $SD = \sqrt{S^2}$

Step 4: Standard Error, $$SE = \frac{SD}{\sqrt{n}}$$

Step 5: Value of data point: $P_i \pm SE$

The above steps have also been incorporated in the SI.

Table 1. Variation of roughness parameters with increased Li-AHA concentration in PVDF/Li-AHA composites made via compression moulding and solution casting.

Sample	**RMS roughness (S_q)**	**Max. peak height (S_p) (nm)**	**Max. pit depth (S_v) (nm)**	**Max. height (S_z) (nm)**
Neat PVDF_CM	4.26	10.86	14.14	33.26
PVDF/6 Li-AHA_CM	5.36	18.48	14.97	25.01
PVDF/15 Li-AHA_CM	11.56	45.68	67.77	113.44
Neat PVDF_SC	4.97	18.79	27.20	46.01
PVDF/6 Li-AHA_SC	6.19	24.01	26.63	50.64
PVDF/15 Li-AHA_SC	12.27	38.70	44.36	83.06

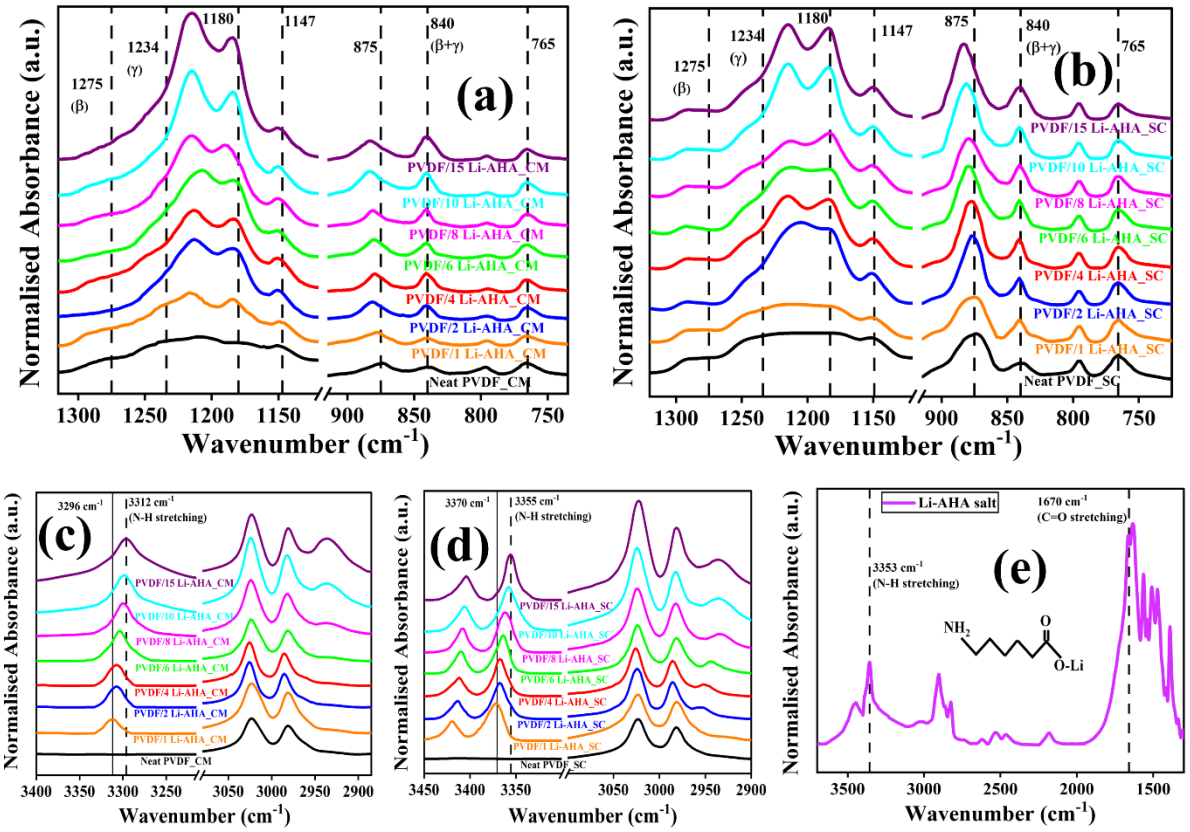

Figure S2 FTIR spectra indicating the -CF_2 peak shift in (a) compression moulded, (b) solution casted neat PVDF and PVDF/Li-AHA nanocomposite films, FTIR spectra indicating the -NH peak shift in (c) compression moulded and (d) solution casted neat PVDF and PVDF/Li-AHA nanocomposite films and (e) FTIR spectrum of pure Li-AHA.

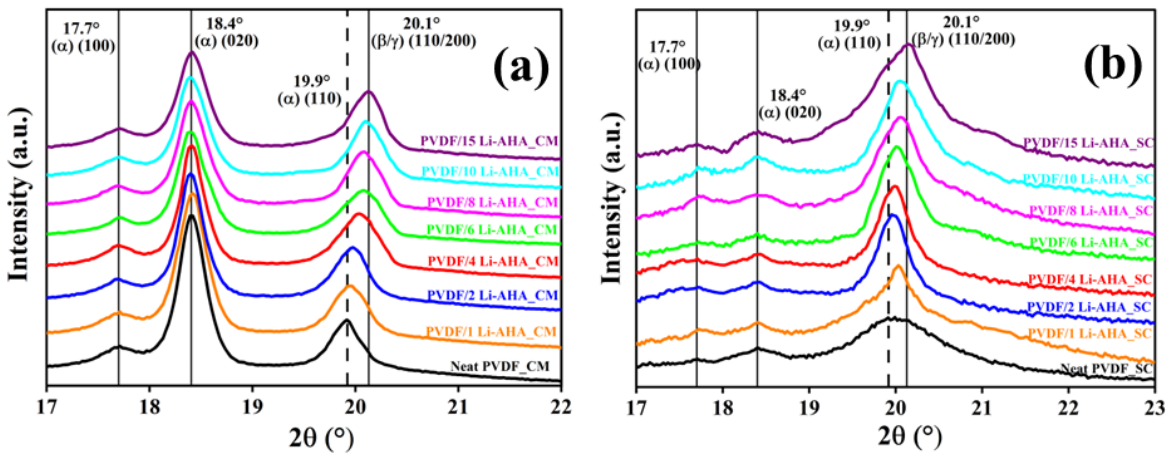

Figure S3 WAXD pattern of (a) neat PVDF and compression moulded PVDF/Li-AHA composites, (b) neat PVDF and solution casted PVDF/Li-AHA composites.

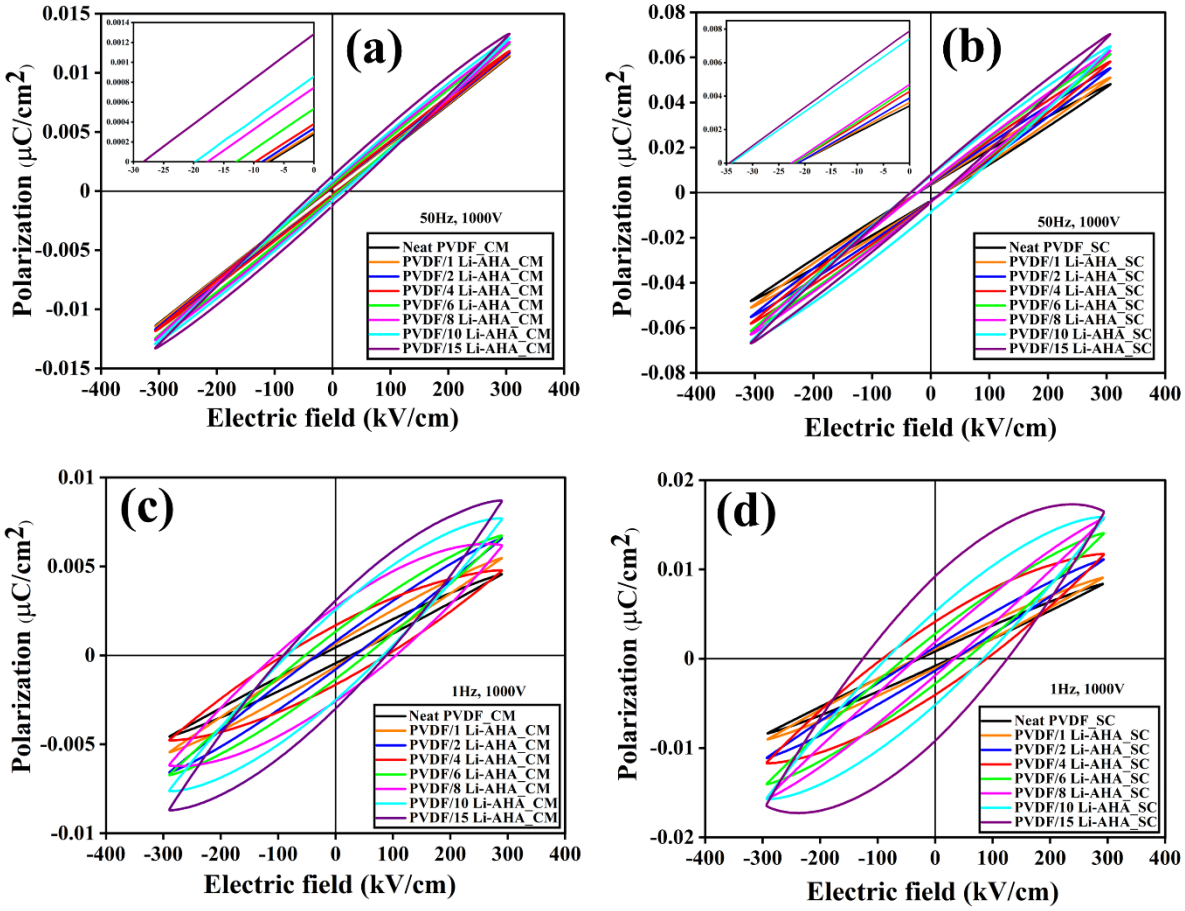

Figure S4 Polarization versus electric field loops at (a,b) 50 Hz frequency of PVDF/Li-AHA composites prepared by (a) compression moulding and (b) solution casting, (c, d) polarization versus electric field loops at 1 Hz frequency of PVDF/Li-AHA composites prepared by (c) compression moulding and (d) solution casting.

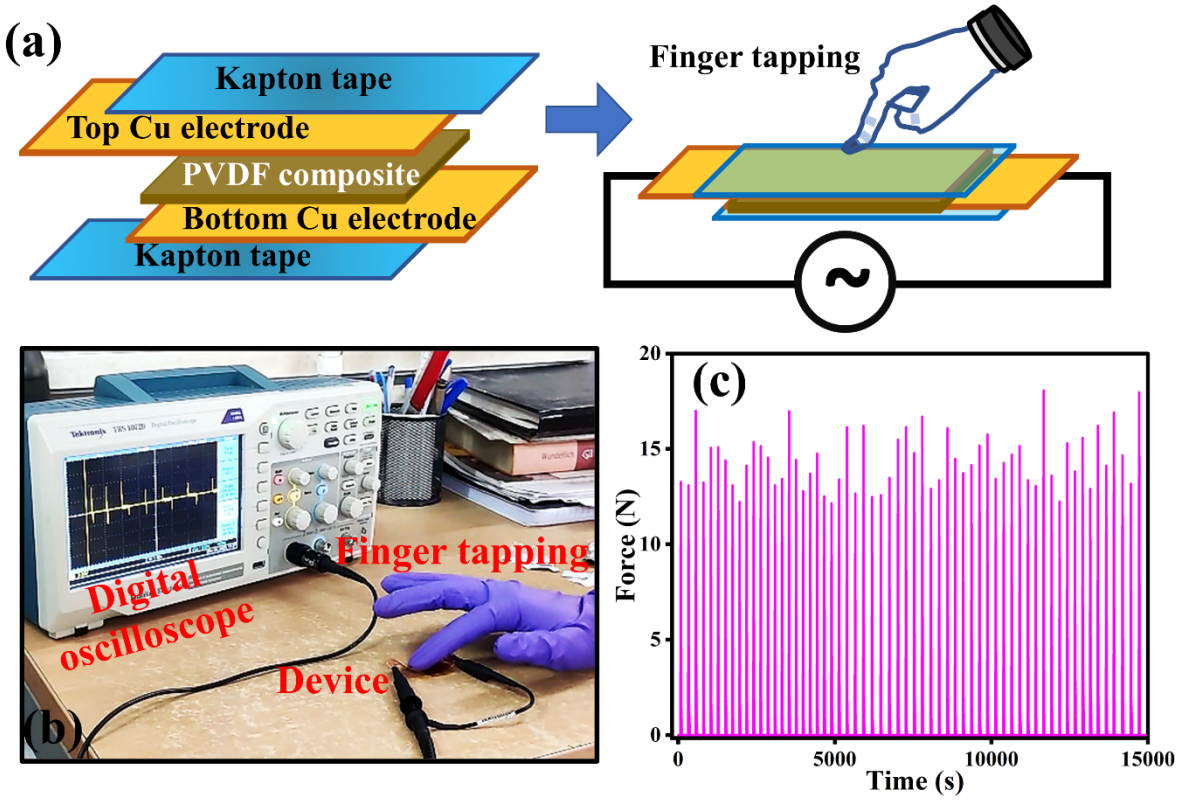

Figure S5 A schematic representation showing the (a) components of the piezoelectric device, (b) piezoelectric device testing set-up and (c) the variation of force applied on the device over time.

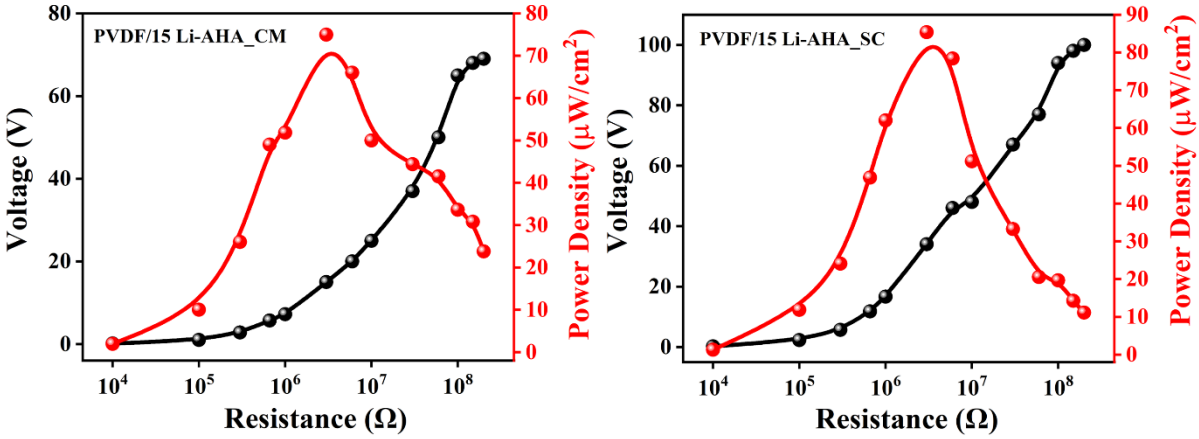

Figure S6 The variation of power density with increased load resistance in compression moulded PVDF/Li-AHA composite film and solution casted PVDF/Li-AHA composite film with 15 wt.% Li-AHA.