Electronic Supplementary Information (ESI)

Enhanced Electro-active Phase in Luminescent P(VDF-HFP)/Zn^{2+} Flexible Composite Film for Piezoelectric Based Energy Harvesting Applications and Self-Powered UV Light Detection

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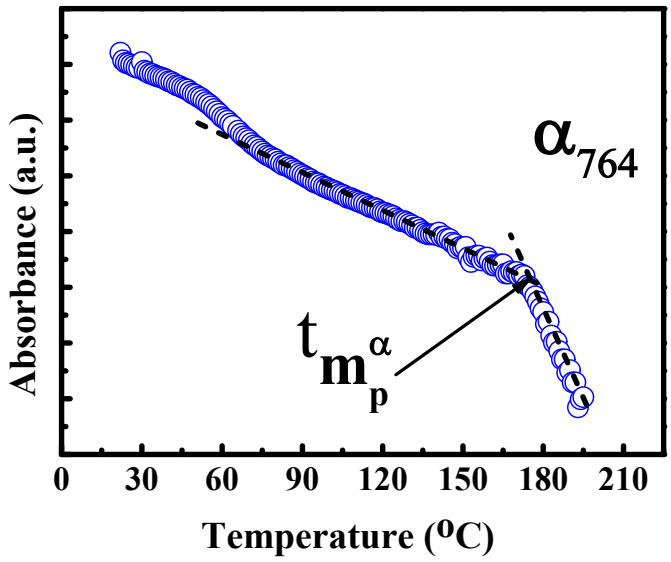

Fig. S1 The absorbance intensity of α- ($^{\alpha}_{764}$) phase appeared at 764 cm^{-1} in HFP film *vs.* scanning temperature plot for representing peak melting temperature.

S1. χ_α, χ_β **and** χ_γ **calculation:**

As HFP film composed of both α- and γ- phase the values of χ_α and χ_γ for the respective crystalline phases are calculated as follows,

$$\chi_\alpha = \chi_c \times \frac{\sum A_\alpha}{\sum A_\alpha + \sum A_\gamma} \%, \text{ and} \qquad \text{(S1)}$$

$$\chi_\gamma = \chi_c \times \frac{\sum A_\gamma}{\sum A_\alpha + \sum A_\gamma} \%, \qquad \text{(S2)}$$

Where, $\sum A_\alpha$ and $\sum A_\gamma$ describe partial areas in XRD peaks in the α- and γ- phases respectively.[S1, S2]

On the other hand as Zn^{2+}- HFP film composed of both β- and γ- phase the values of χ_β and χ_γ for the respective crystalline phases are calculated as follows,

$$\chi_\beta = \chi_c \times \frac{\sum A_\beta}{\sum A_\beta + \sum A_\gamma} \%, \text{ and} \quad \text{(S3)}$$

$$\chi_\gamma = \chi_c \times \frac{\sum A_\gamma}{\sum A_\beta + \sum A_\gamma} \%, \quad \text{(S4)}$$

Where, $\sum A_\beta$ and $\sum A_\gamma$ describe partial areas in XRD peaks in the β- and γ-phases respectively.

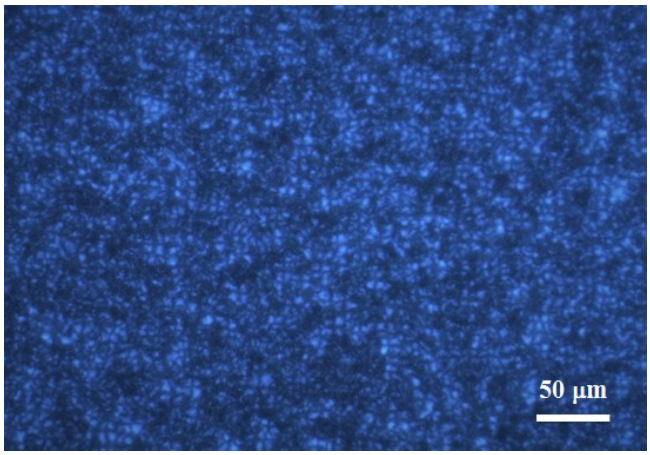

Fig. S2 Polarized optical microscopy (POM) image of the HFP film under cross polarizer.

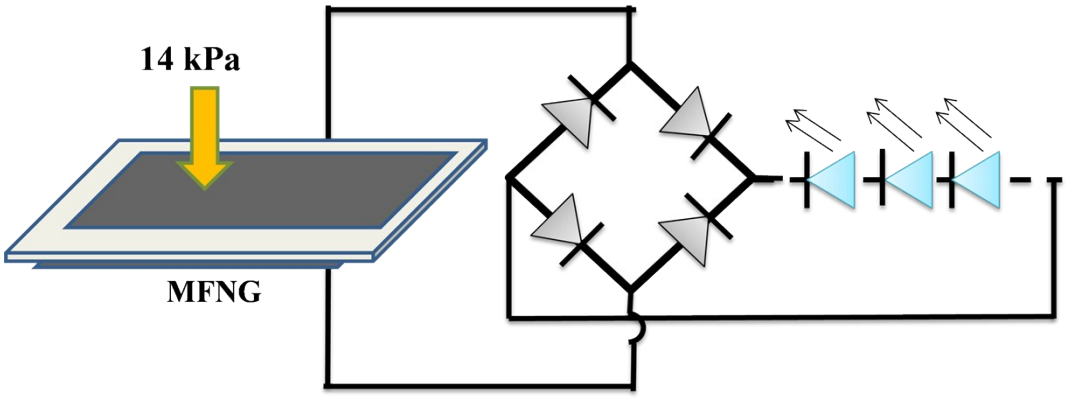

Fig. S3 Circuit diagram for representing the illumination of blue LEDs under repetitive finger touch and release motion (applied pressure amplitude ~ 14 kPa)

References

S1 P. Adhikary, S. Garain, S. Ram and D. Mandal, *J. Polym. Sci. B: Polym. Phys.*, 2016, **54**, 2335−2345.

S2 S. Garain, T. K. Sinha, P. Adhikary, K. Henkel, S. Sen, S. Ram, C. Sinha, D. Schmeißer and D. Mandal, *ACS Appl. Mater. Interfaces*, 2015, **7**, 1298−1307.