**Supplementary Information**

**Mechanical and wear behaviour of Poly(vinylidene fluoride)/clay nanocomposite**

**Anupama Gaur1, Dipak Rana2, Pralay Maiti1\***

1School of Materials Science and Technology, Indian Institute of Technology (Banaras Hindu University), Varanasi, India-221005.

2 Industrial Membrane Research Institute, Department of Chemical and Biological Engineering, University of Ottawa, 161 Louis Pasteur St., Ottawa, ON, Canada KIN 6N5



**Figure S1:** Deconvolution of XRD pattern for determining different phase fractions.

The deconvolution for XRD pattern is used to determine the amount of phases present in the composite. For this, the total areas of the all peaks are calculated and for each phase its percentage is calculated.



**Figure S2:** FTIR spectra at higher region for pure PVDF and nanocomposites.

FTIR spectra at higher region also shows the β-phase peak at 1232 cm-1, γ-phase peak at 1272 cm-1 in the nanocomposites, which is absent in the pure PVDF. Similarly we can see the absence of α-phase peaks at 1140 and 1210 cm-1 in the nanocomposites, which is present in the pure PVDF.



**Figure S3:** Toughness from experimental stress-strain curve.

The elongation at break and the toughness of the nanocomposite increases with increasing the nanoclay content.



**Figure S4:** SEM image of worn PC8 nanocomposite.

There is significant improvement in structural and mechanical properties on incorporating the nanoclay in PVDF. The modulus and hardness increases by 30 and 50% respectively and the coefficient of friction decreases by 30% in the nanocomposite.

The potential application for this material is in piezoelectric sensors and actuators, where along with the better piezoelectric properties the mechanical stability is also required; so that these can be used in daily life applications.