Electronic Supplementary Information

Ionic polymer-metal nanocomposite sensor using the direct attachment of acidic ionic liquid in a polymer blend

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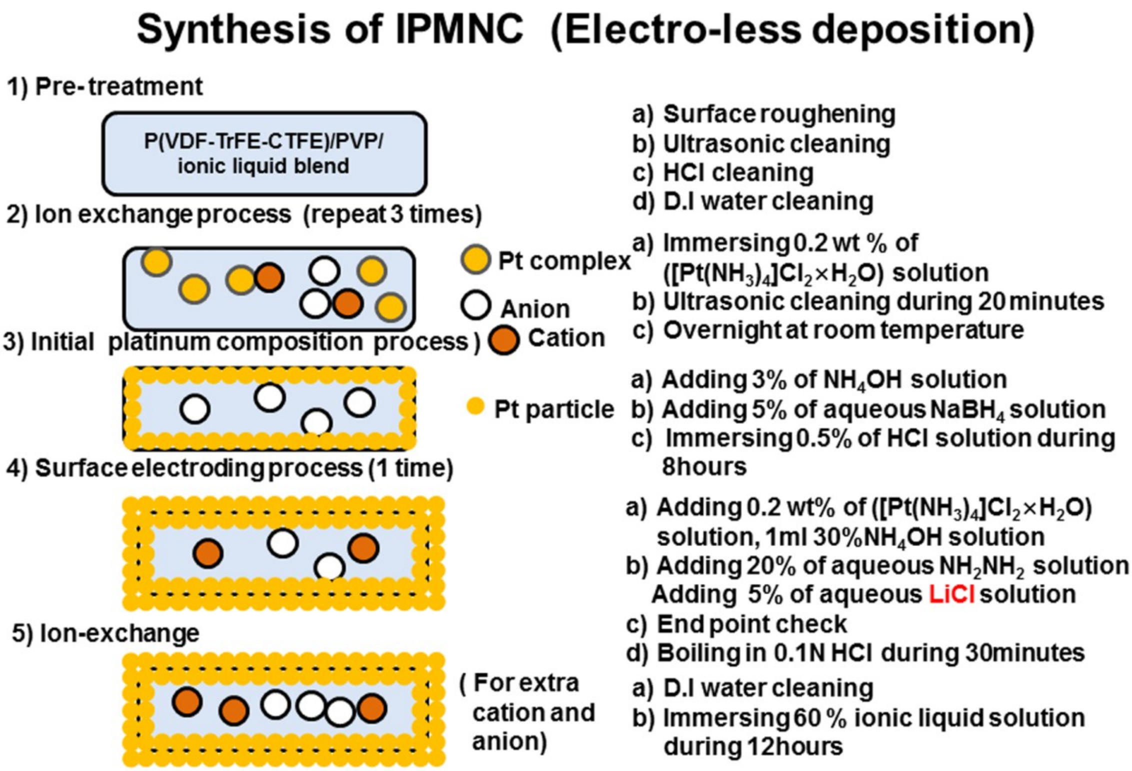

Fig.S1Fabrication of IPMNC

Fig.S1 shows the fabrication method of IPMNC using ionic liquid embedded P (VDF-TrFE-CTFE)/PVP membrane using electroless deposition method.

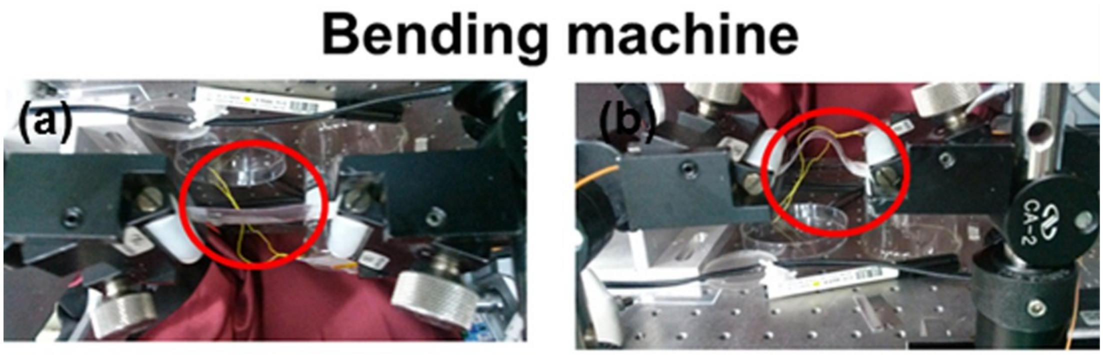

Fig. S2 (a) Clamping of IPMNC sample (a) without bending state (b) bending state

Fig. S2 (a) shows the IPMNC sample without bending state. Fig. S2 (b) shows the IPMNC sample with a bending state.

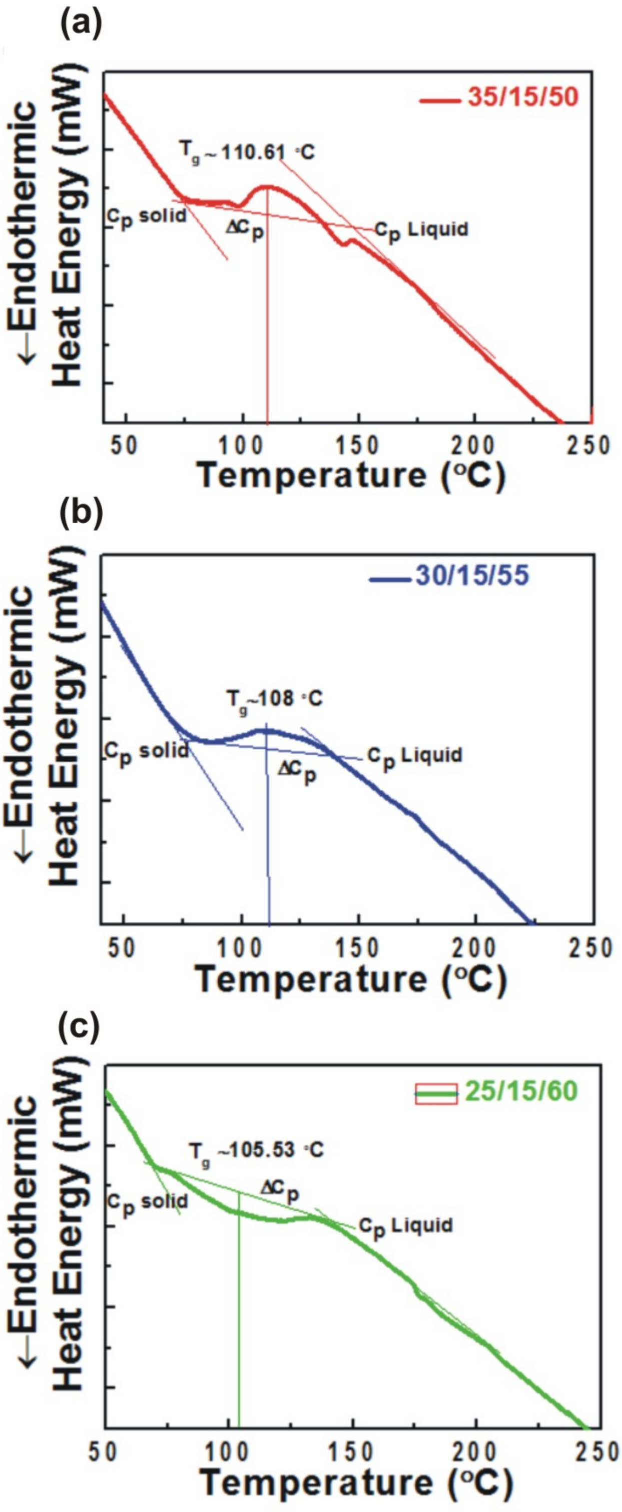

Fig. S3 DSC spectra for estimation of T_g of 35/15/50, 30/15/55, and 25/15/60.

Fig. S3 shows theDSC spectra for estimation of T_g of 35/15/50, 30/15/55, and 25/15/60. To calculate the T_g of the blend, the transient between Cp_{solid},$Cp_{liquid,}$ and lines tangential to the Cp_{solid}, Cp_{liquid}were drawn. The T_g onset and T_g end-set are determined using intersections between Cp_{solid}, $Cp_{liquid,}$ and transient respectively. The T_g of the blend is estimated as a midpoint of the segment between T_g onset and T_g end-set.

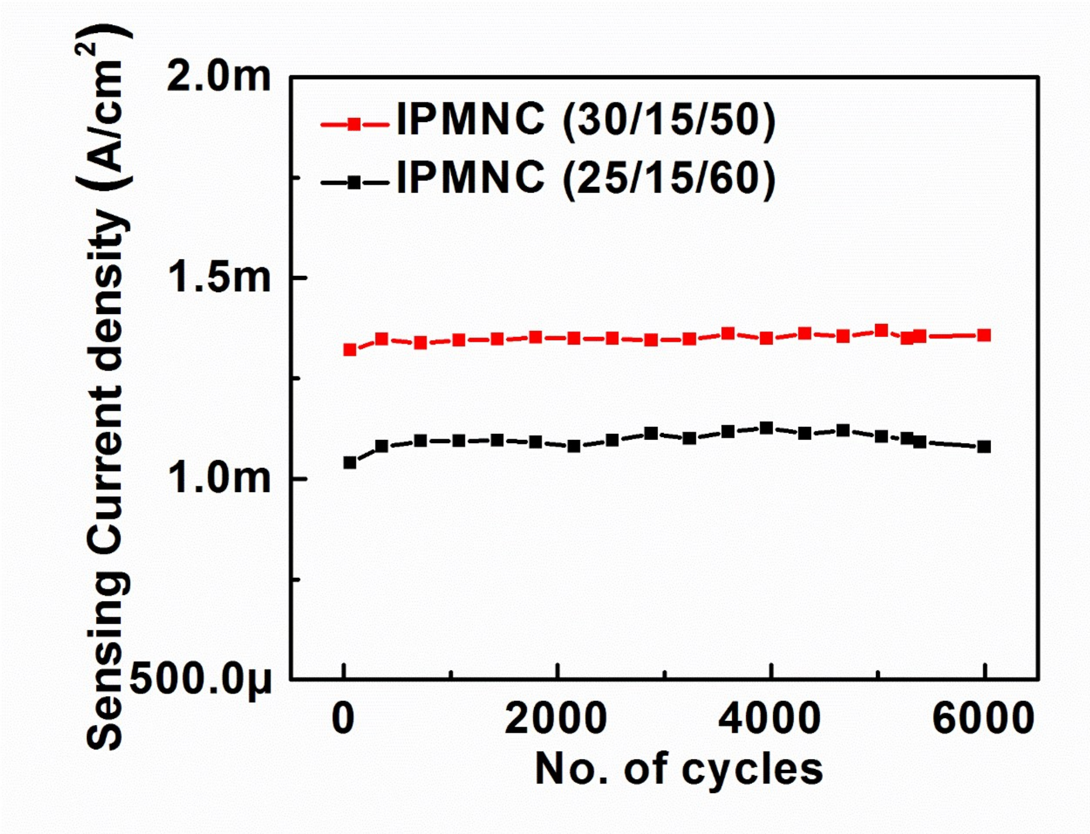

Fig. S 4 The sensing current of the IPMNC using 30/15/55 and 25/15/60 blends with a number of cycles at bending strain of 0.009

The sensing current of the IPMNC using 30/15/55 and 25/15/60 blends with a number of cycles bending strain of 0.009 is shown in Fig. S3.

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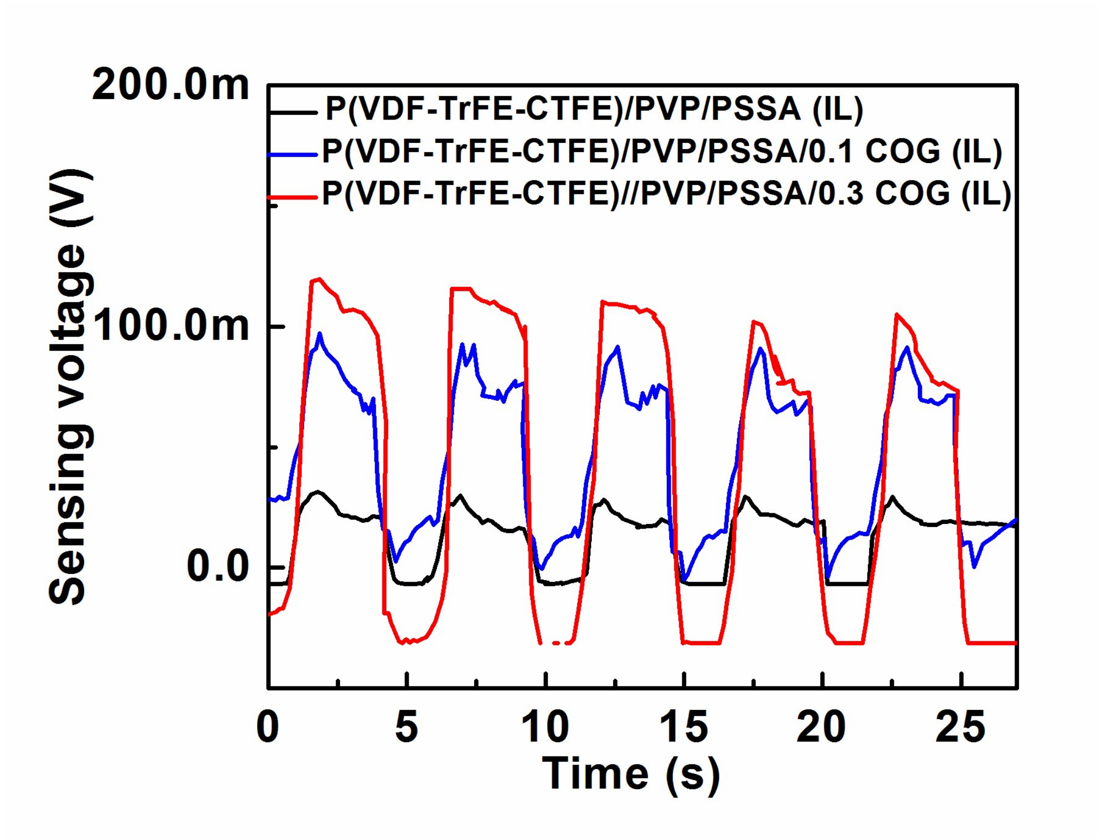

Fig. S5 Sensing voltage of the P(VDF-TrFE-CTFE)/PVP/PSSA (ionic liquid (IL)),P(VDF-TrFE-CTFE)/PVP/PSSA (ionic liquid (IL)),(0.1 COG),P(VDF-TrFE-CTFE)/PVP/PSSA (ionic liquid (IL)),(0.3 COG).

For comparison of sensing voltage of ionic liquid embedded P(VDF-TrFE-CTFE) with previous work of polyelectrolyte and carboxylic graphene attached P(VDF-TrFE-CTFE) for energy harvesting, the sensing voltage of the P(VDF-TrFE-CTFE)/PVP/PSSA and P(VDF-TrFE-CTFE)/PVP/PSSA/carboxylic graphene are shown in Fig. S5.

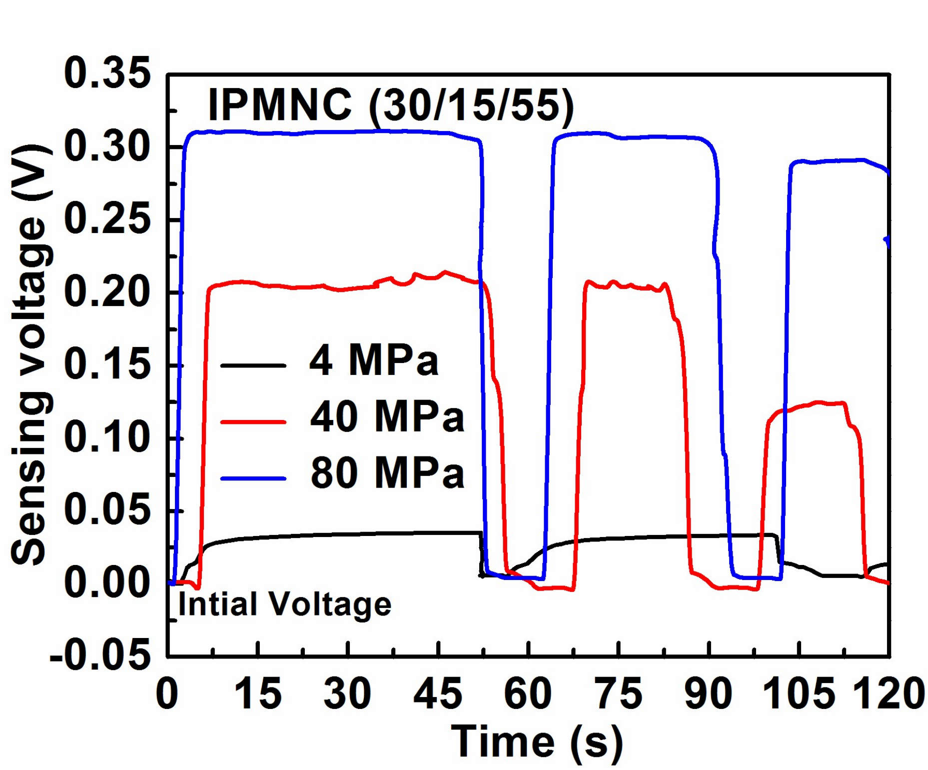

Fig. S 6Sensing voltage of the 30/15/55 with a time at 4, 40, and 80 MPa

The IPMNC 30/15/55 displayed high sensing voltage of the 0.3 Volt with the fast response time. In addition, sensing voltage variation of IPMNC 30/15/55 with time is shown in Fig. S6 at different pressure of 4 MPa, 40 MPa, and 80 MPa.