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Electronic Supplementary Information

Cholesterol based imidazolium ionic liquid crystal: Synthesis, characterisation and its dual application as an electrolyte and electrode material

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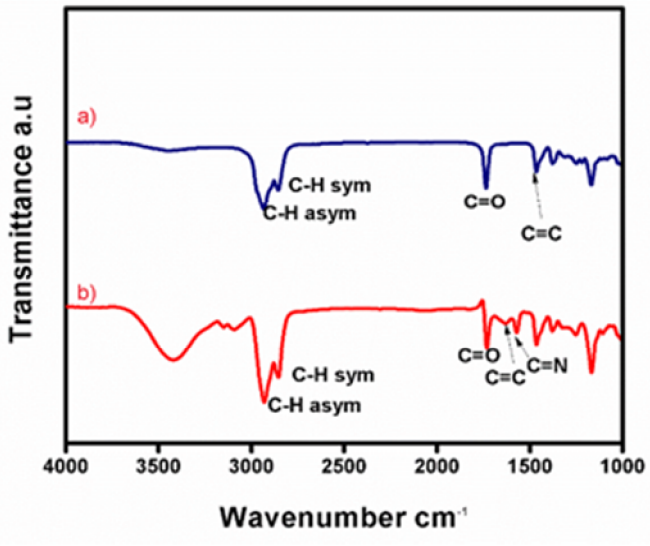

Fig. S1.FT-IR spectra of a) compound **2** and b) ILC compound [Cdim]Br

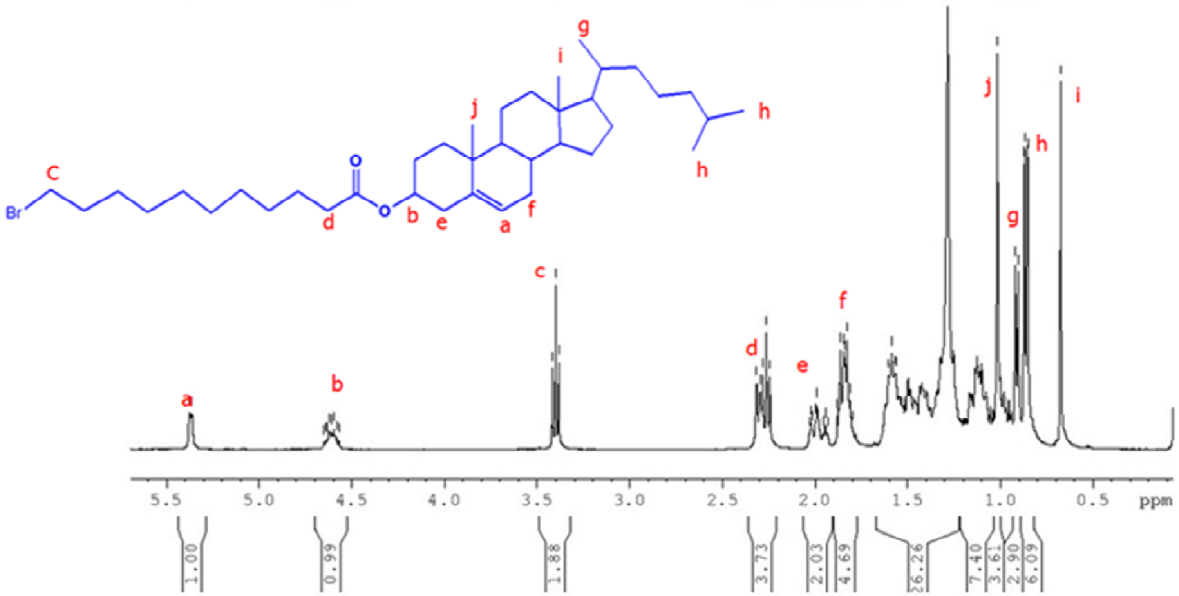

Fig. S2.[1]HNMR spectrum of compound **2**

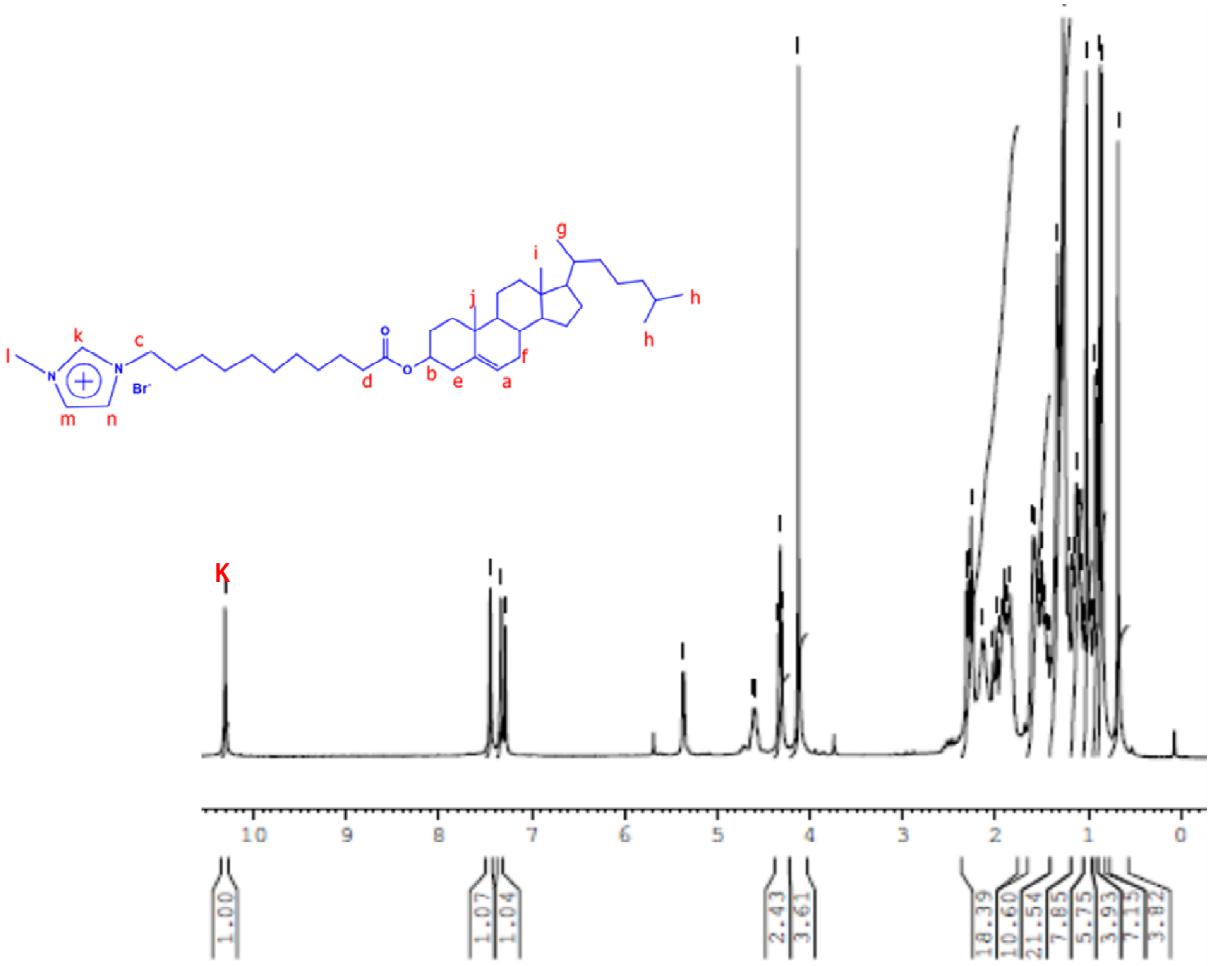

Fig. S3a. ^{1}H NMR spectrum of [Cdim]Br

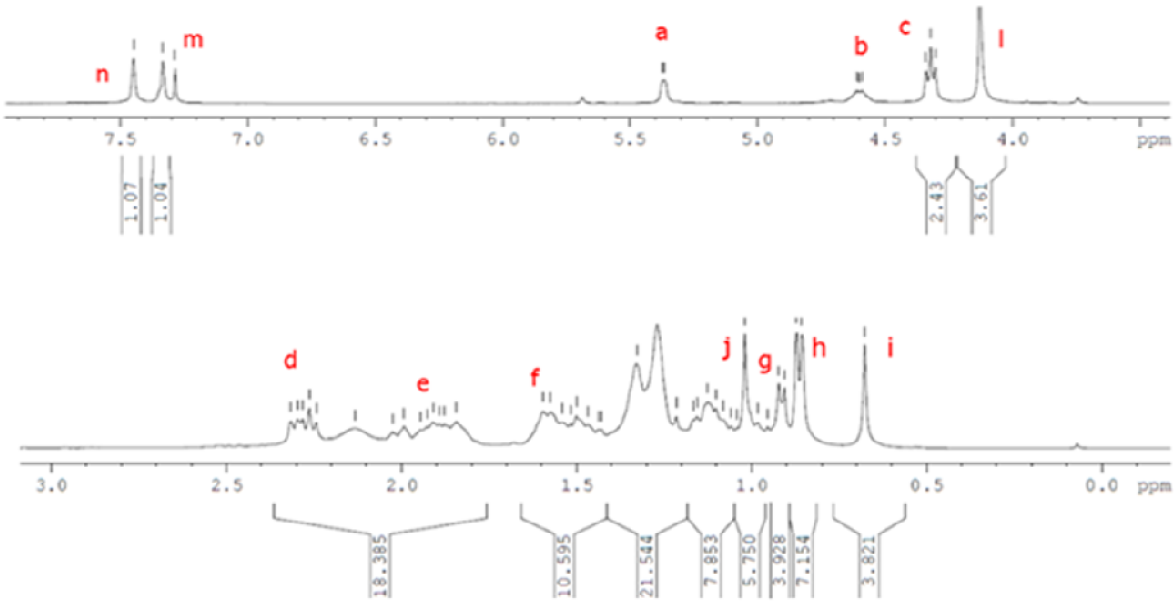

Fig. S3b. ^{1}H NMR spectrum of [Cdim]Br , expanded

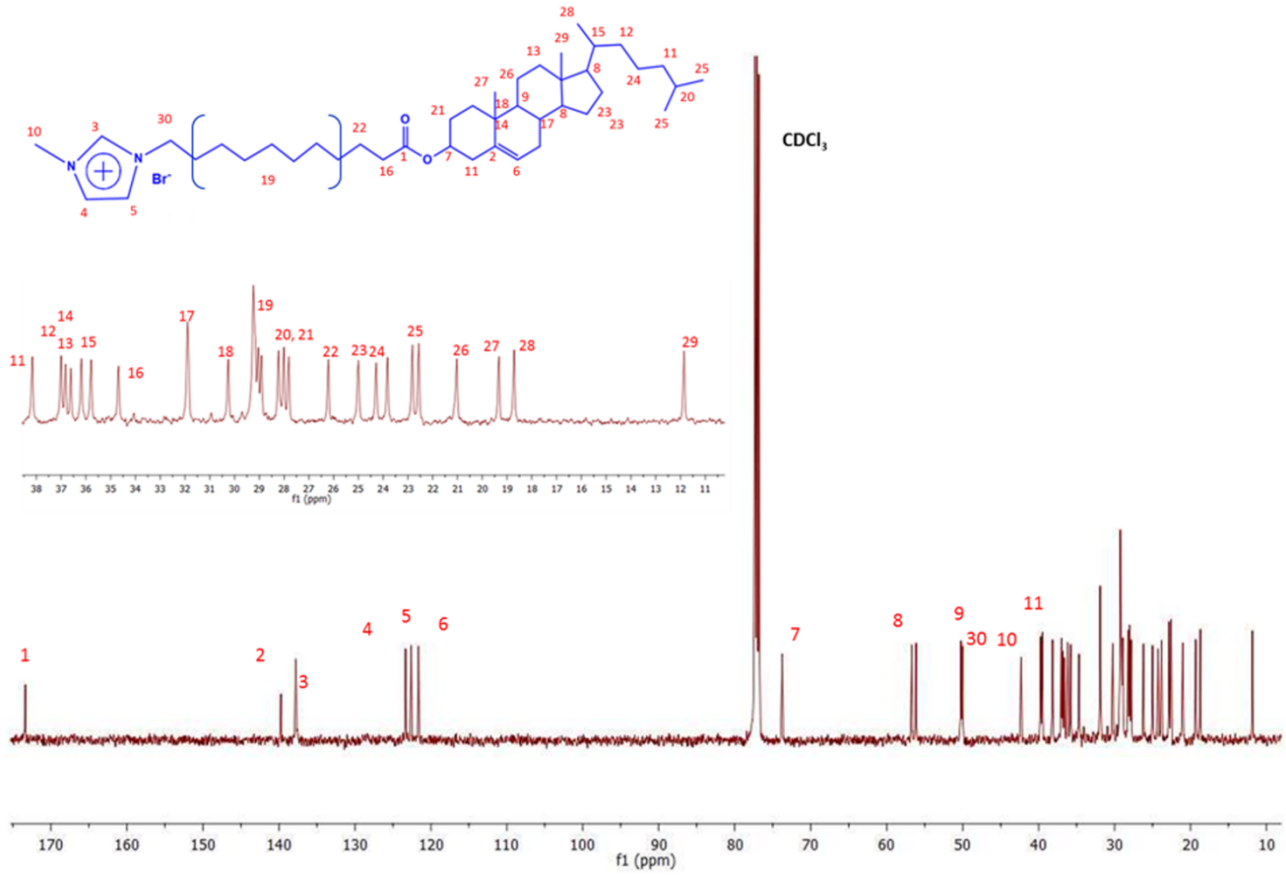

Fig. S4. ^{13}C NMR spectrum of ILC **3**

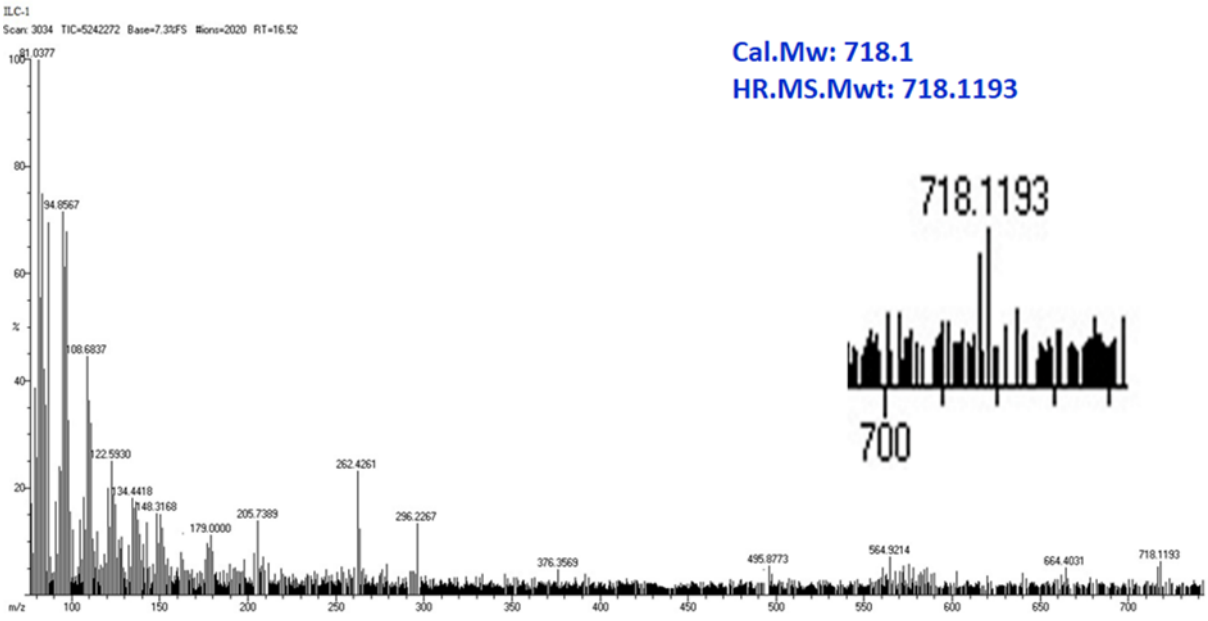

Fig. S5. High resolution mass spectrum of ILC **3**

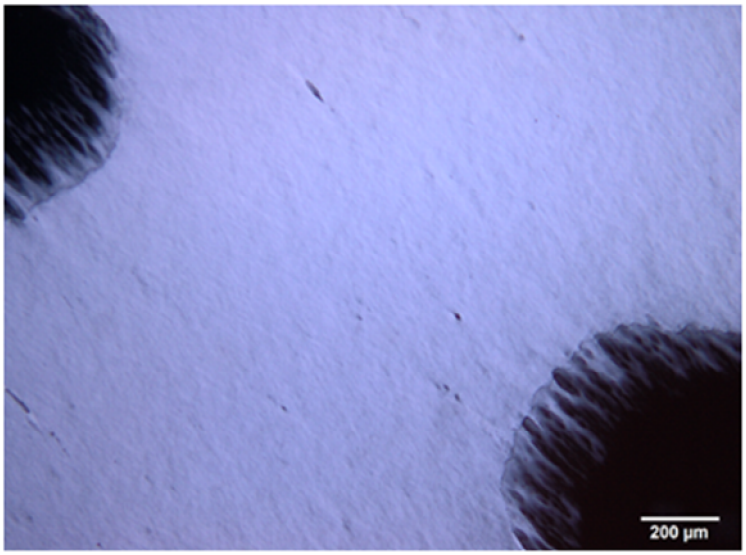

Fig. S6. POM image of [Cdim]Br recorded upon shearing the sample at room temperature

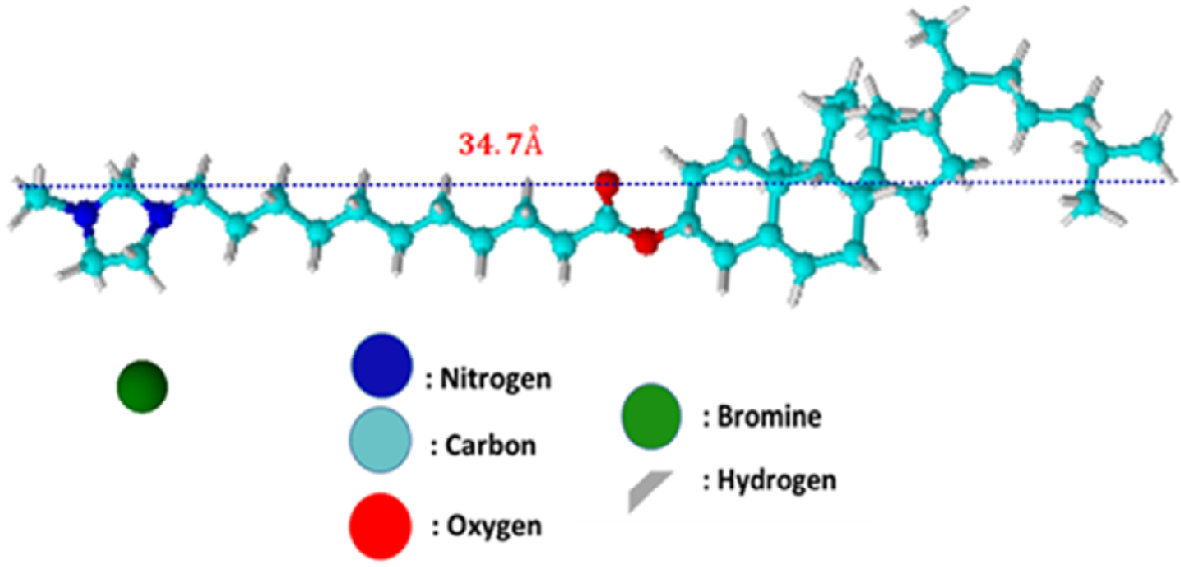

Fig. S7. An optimised molecular model for [Cdim]Br in a stretched *all-trans* alkyl chain conformation (from ACD chemlab-3D viewer)

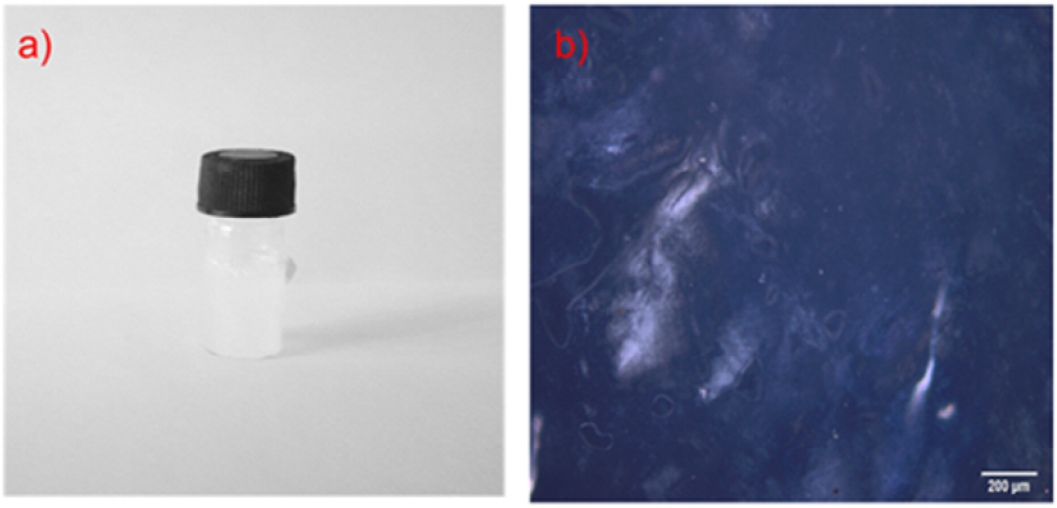

Fig. S8. a) 0.5 M of ([Cdim]Br) in water, b) POM image of the mixture shown in Fig. 8a in a normal glass slide and cover slip.

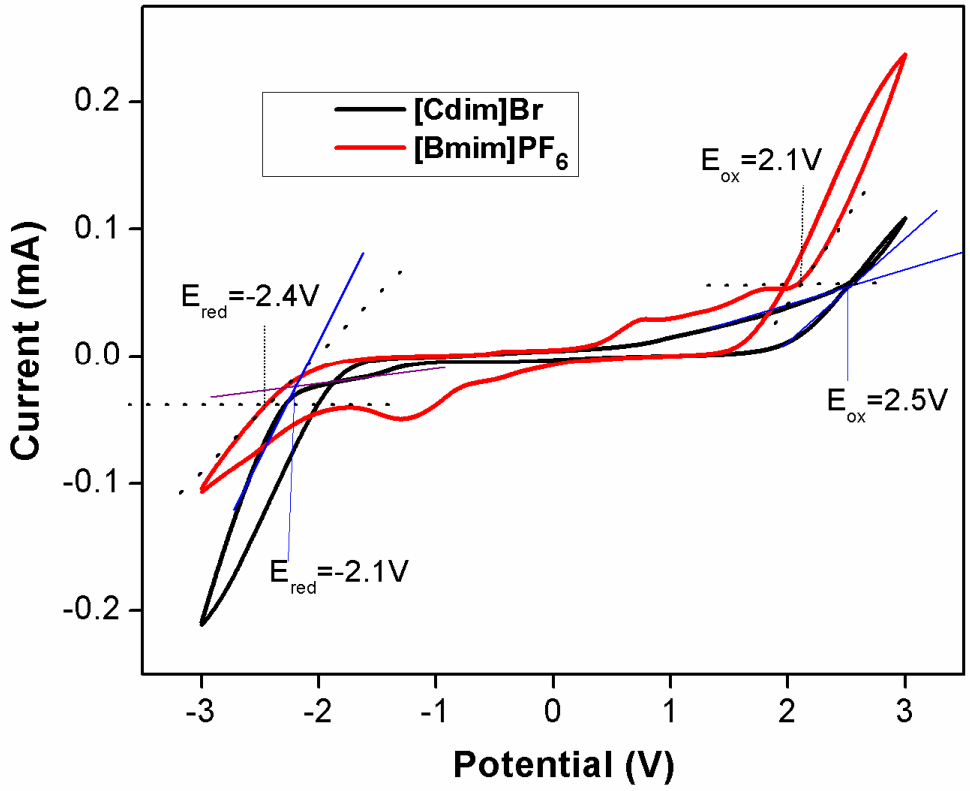

Fig. S9. CVs of 1mM [Cdim]Br and [Bmim]PF_6 in 5% ethanol at a scan rate of 50mVS^{-1}

Electrochemical window was calculated by using geometric construction: By drawing tangents to both sides of the cyclic voltammogram right before the steep increase of the current occurs, and by additionally drawing tangents into the increasing parts thereby intersection points were determined to calculate the respective cathodic and anodic stability limits.[1]

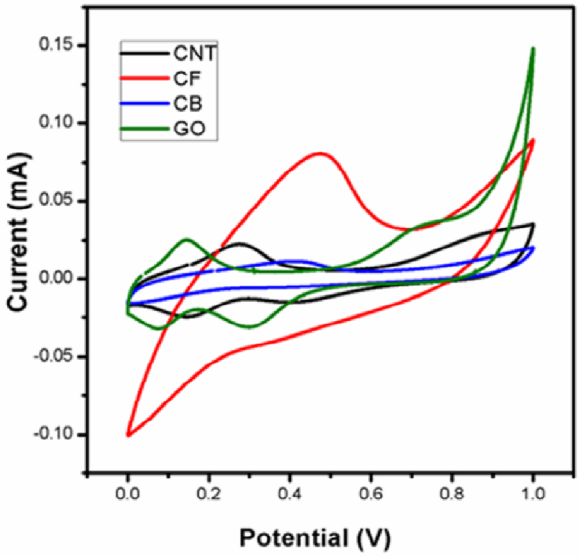

Fig. S10. Cyclic voltammograms of various electrodes namely CNT, CF, CB and GO in the synthesised ILC medium (0.5% in ethanol) at a scan rate of 5 mVs^{-1}.

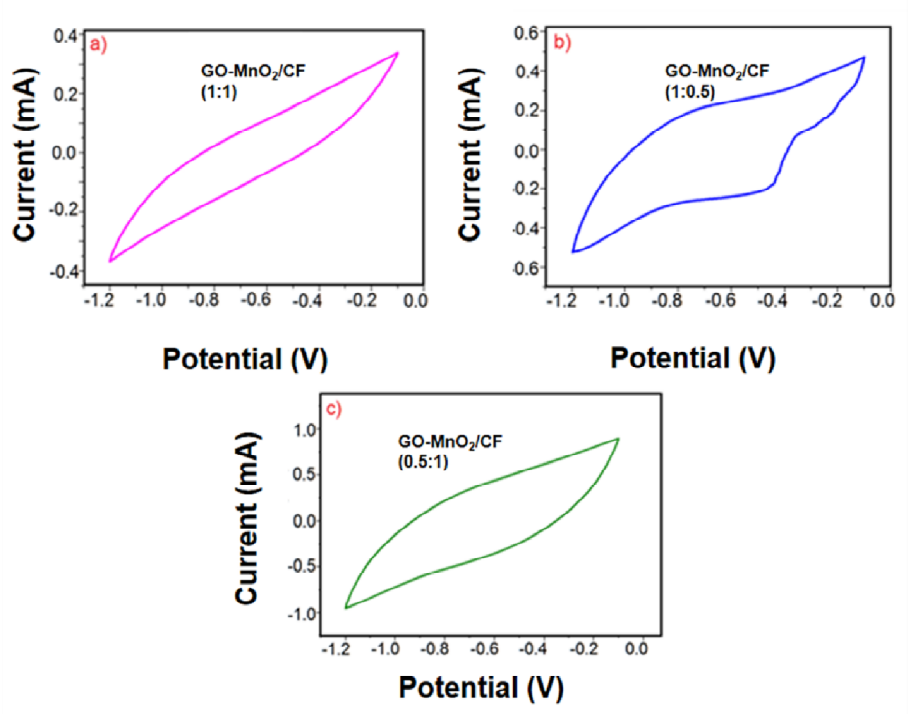

Fig. S11: Negative potential CV graph at 25 mVs^{-1}, (a) GO-MnO_2(1:1)/CF (b) GO-MnO_2 (1:0.5)/CF (c) GO-MnO_2(0.5:1)/CF hybrid electrodes in ILC electrolyte medium (0.5% in ethanol) respectively.

References

1. J. Wallauer, M. Drüschler, B. Huber *et al, Zeitschrift für Naturforschung B*, 2014, **68,** 1143-1153.