Electronic supporting information

Preparation of natural deep eutectic solvent mediated self polymerized highly flexible transparent gel having super capacitive behaviour

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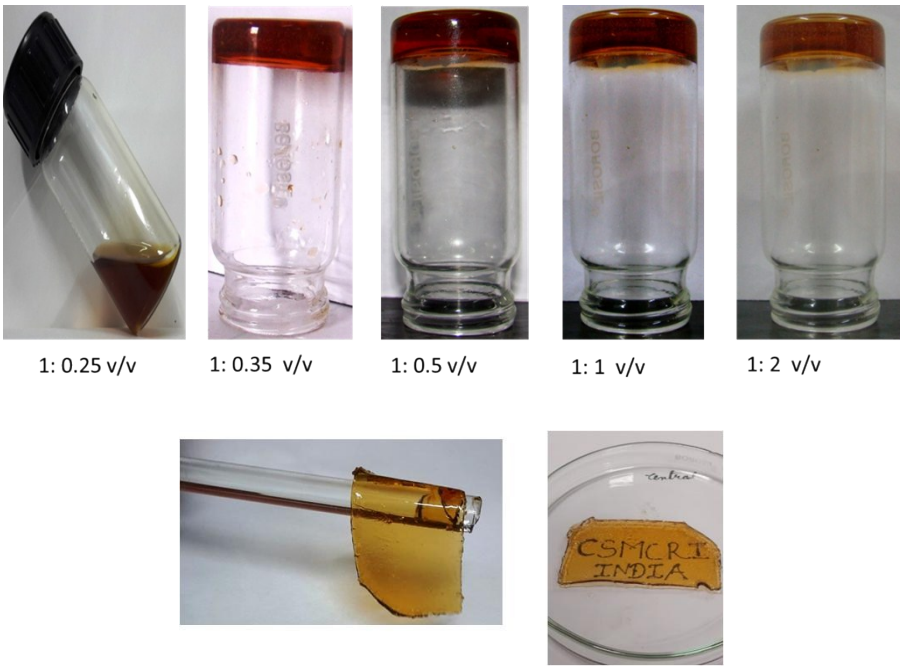


Figure S1: Digital photographs of ChoCl.Or 1:1.5 in presence of HEMA in different concentrations and transparent ion gel thus fomed.

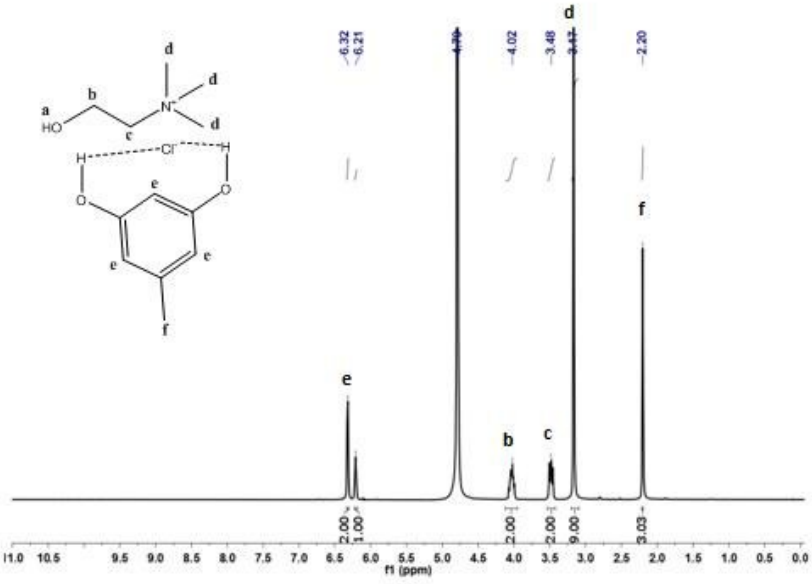


Figure S2: ^{1}H NMR of ChoCl.Or 1:1.5

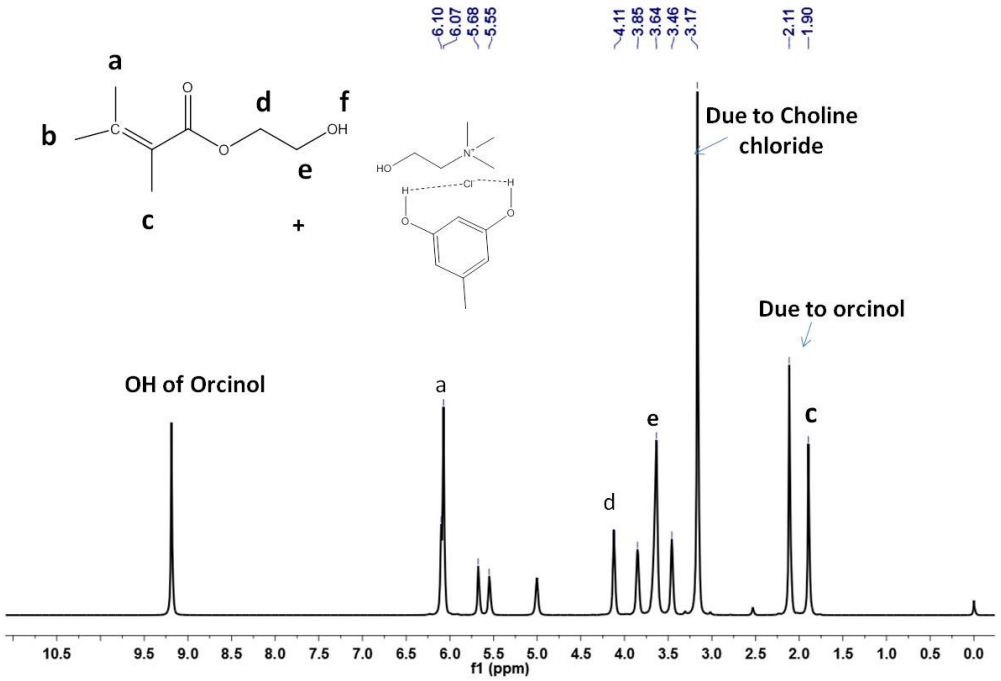


Figure S3: ^{1}H NMR of HEMA in ChoCl.Or 1:1.5 before polymerization.

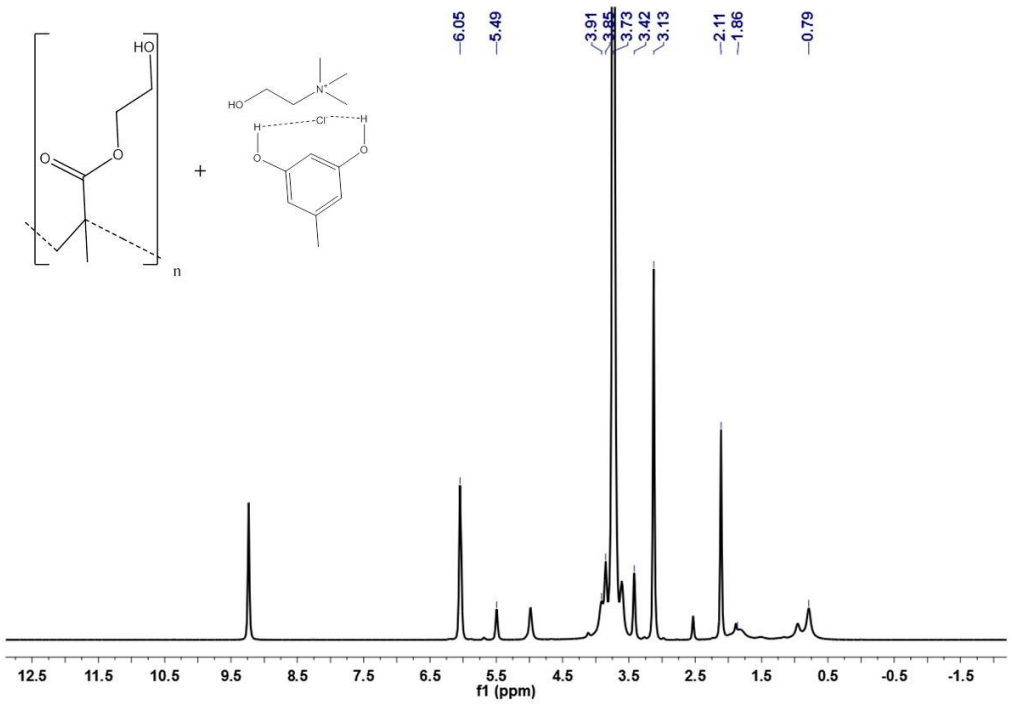


Figure S4: ^{1}H NMR of HEMA in ChoCl.Or 1:1.5 after polymerization.

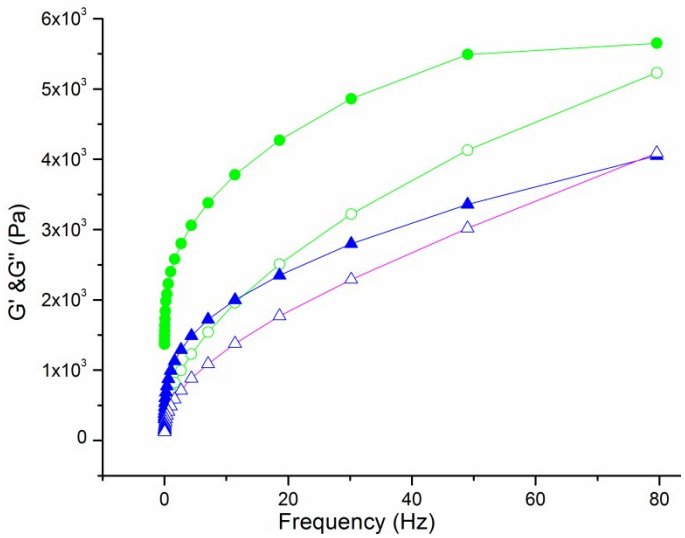


Figure. S5: Frequency dependence viscoelastic behavior of HEMA ionogels [closed circles /triangles = G' and open circles /triangles = G". Blue colour for Chol.Cl-Or: HEMA (1: 0.35 v/v) and green colour for Chol.Cl-Or: HEMA (1: 0.5 v/v).

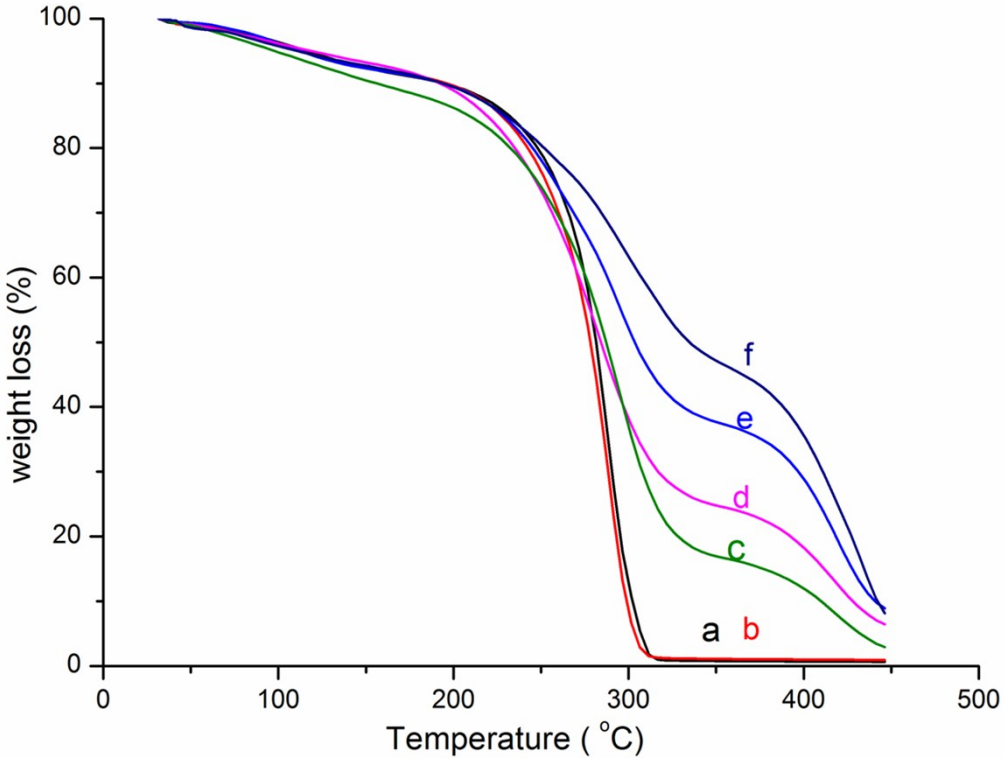


Figure S6: TGA of (a) Chol.Cl-Or, (b) unpolymerised Chol.Cl-Or: HEMA 1: 0.25 v/v), (c) polymerised (Chol.Cl-Or: HEMA 1: 0.35 v/v), (d) polymerised (Chol.Cl-Or: HEMA 1: 0.5 v/v), (e) polymerised (Chol.Cl-Or: HEMA 1: 1 v/v), (f) polymerised (Chol.Cl-Or: HEMA 1: 2 v/v).

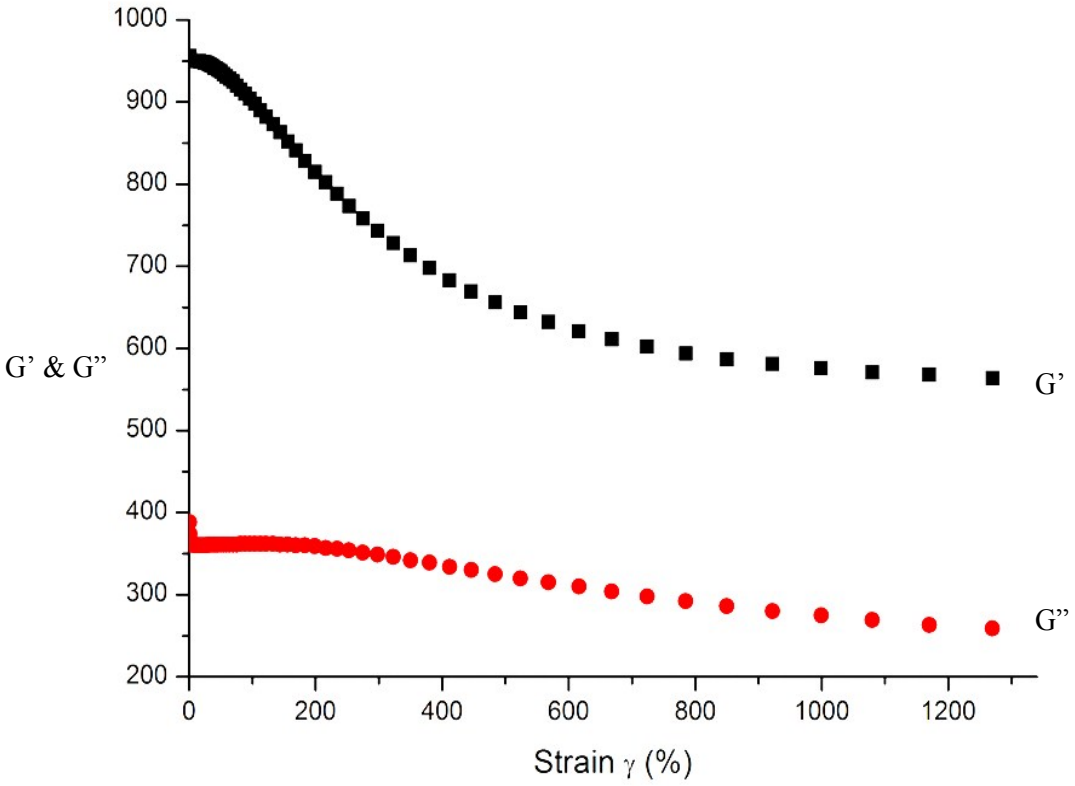
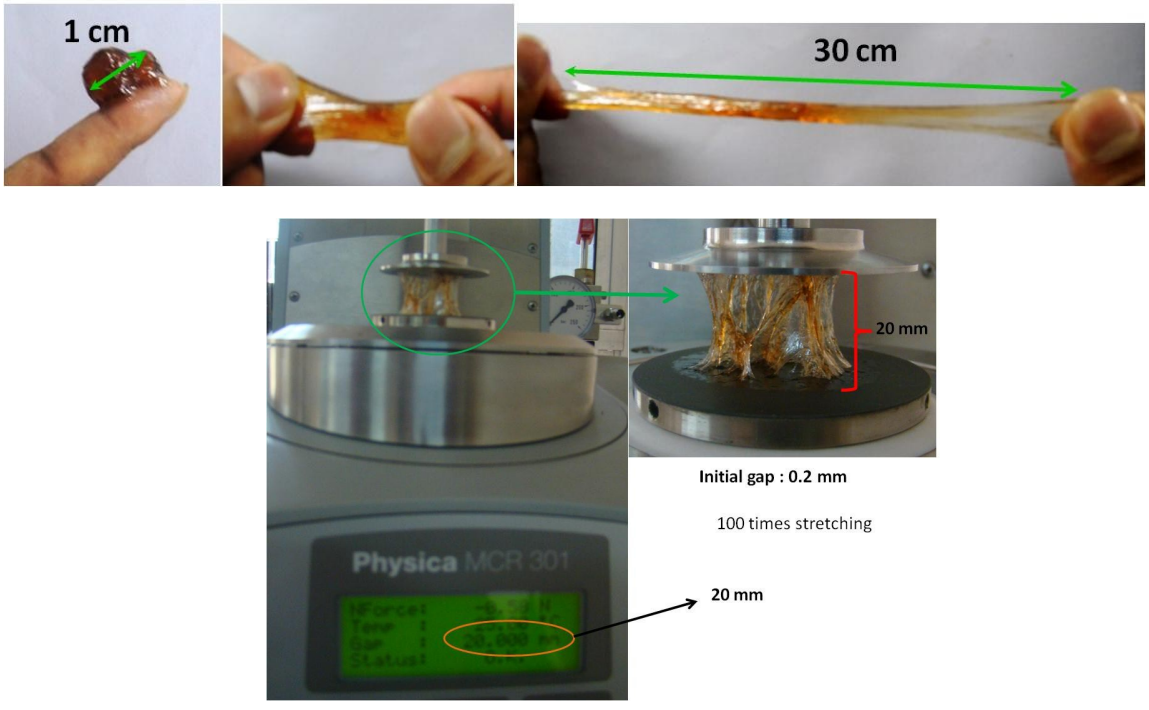


Figure S7 : G' and G'' vs applied strain at constant frequency.



Strechability of the gel observed during rheological measurements.

Figure S8 : Manual strechability of the HEMA ion gel prepared in ChoCl.Or 1:1.5 at 1:0.35 and strechability observed during rheological measurements.

Table S1: Optimization of mole ratio for NADES preparation

Choline chloride and oricinol in mole ratio	Observation	Polymerization of HEMA at room temperature
1: 1	NADES formed	Took place after 24 h
1:1.5	NADES formed	Took place within 1.5 h

Table S2. Conductivity of ionogel calculated from the impedance measurements.

Gel Composition	**R_{gel} resistance of gel (ohms)**	**thickness of gel, *t* (cm)**	**σ conductivity ($mS.cm^{-1}$)**
ChoCl.Or : HEMA (1:0.35)	118.7926	0.175	1.47
ChoCl.Or : HEMA (1:0.5)	798.5015	0.175	0.21
ChoCl.Or : HEMA (1:1)	703.3494	0.175	0.24
ChoCl.Or : HEMA (1:2)	3535.238	0.175	0.049
Pure (ChoCl.Or)	65.52	0.175	2.67

Table S3. Summarised table containing specific capacitance of different ion gels at different scan rates

0.35 % (-1 to 1) 100 µg		**0.5% (-1 to 1) 100 µg**		**1% (-1 to 1) 100 µg**		**0.5 % (-3.5 to 3.5) 1.5 mg**	
Scan Rate (mV/s)	**Sp. C (F/g)**	**Scan Rate (mV/s)**	**Sp. C (F/g)**	**Scan Rate (mV/s)**	**Sp. C (F/g)**	**Scan Rate (mV/s)**	**Sp. C (F/g)**
1	355	1	265	1	110.5	-	-
2	198.5	2	143.12	2	66.6	-	-
5	86.15	5	91.65	5	34.4	-	-
10	44.6	10	40.7	10	15.82	-	-
50	11.28	50	11.28	50	4.03	50	7.84
100	6.12	100	6.26	100	2.51	100	3.77
200	4.08	200	3.22	200	1.37	200	2.76
500	1.39	500	1.42	500	0.64	500	1.24