Electronic Supplementary Material (ESI) for Green Chemistry.

Supporting Information

Surface Active Ionic Liquid Assisted Metal-Free Electrocatalytic-Carboxylation in Aqueous phase: A Sustainable approach for CO_2 utilization paired with electro-detoxification of Halocarbons

Sarwar Ahmad Pandit[a], Sajad Ahmad Bhat[a], Mudasir Ahmad Rather[a], Feroz Ahmad Sofi[a], Pravin P. Ingole[b], Zahid Manzoor Bhat[c], Musthafa Ottakam Thotiyl[c], Khursheed Ahmad Bhat[d], Shakeel-u-Rehman[d], Mohsin Ahmad Bhat[a,*]

[a] *Department of Chemistry, University of Kashmir, Hazratbal Srinagar, India*
**e-mail; mohsin@kashmiruniversity.ac.in Tel: +91 9419033125.*
[b] *Department of Chemistry, Indian Institute of Technology Delhi, New Delhi-110016, India.*
[c] *Department of Chemistry and Centre for Energy Science, Indian Institute of Science Education and Research (IISER), Pune, Dr. Homi Bhabha Road, Pune 411008, India.*
[d] *CSIR – Indian Institute of Integrative Medicine, Canal Road, Jammu – 180001.*

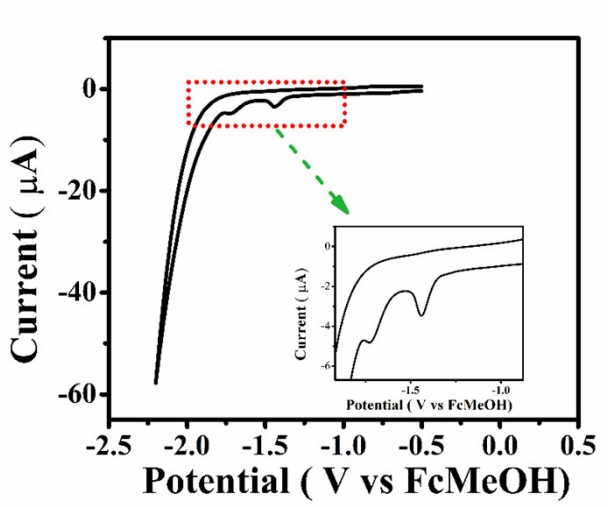

Figure S1: A typical CV recorded for [DDMIM][Cl] micelle solubilized 9-BAN in the full potential window. Inset to the figure shows zoomed out region of the CV trace to clearly depict the faradaic signals characteristic to the presence of 9-BAN.

Separation and extraction:

After completion of electrolysis of 9-BAN in presence of CO_2, the reaction mixture was taken in a separating flask and toluene was added to it in small batches resulting in the formation of two layers- lower aqueous layer and upper toluene layer. Toluene phase was separated out and 10% aqueous NAOH was added dropwise, which is expected to convert carboxylic acid (9-Anthracene carboxylic acid) into its sodium salt. The sodium salt of 9-Anthracene carboxylic acid will remain in the aqueous phase. 10 % aqueous HCl was added dropwise to the aqueous phase to convert sodium salt back to carboxylic acid. Again toluene was added to above mixture in batches so that carboxylic acid is extracted in the toluene phase. The separated toluene phase was taken and solvent was removed through vacuum evaporation which resulted in the formation of yellow solid. Later was recyrstallised in methanol resulting in the formation of yellow crystalline solid which was further characterized through IR and NMR measurements. A sample IR spectrum recorded for the sample aliquots from electrocarboxylation mixture depicted in Figure S3 clearly reflects

the formation of -OH and -C=O characteristic bands post electrocarboxylation of 9-BAN saturated [DDMIM][Cl] micellar solution. NMR spectrum as recorded for the final product is shown in Figure S3. It can been seen that NMR characteristics match very well with 9-Anthracene Carboxylic acid.

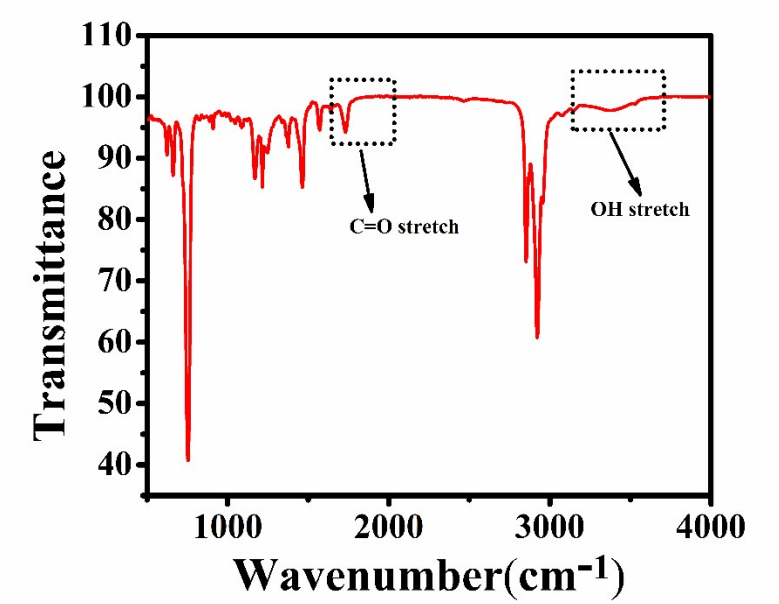

Fig S2. A typical IR spectrum recorded for the 9-Anthracene carboxylic acid extract from the electrolysis mixture of aqueous micellar solution that was used for the bulk scale eletrocarboxylation.

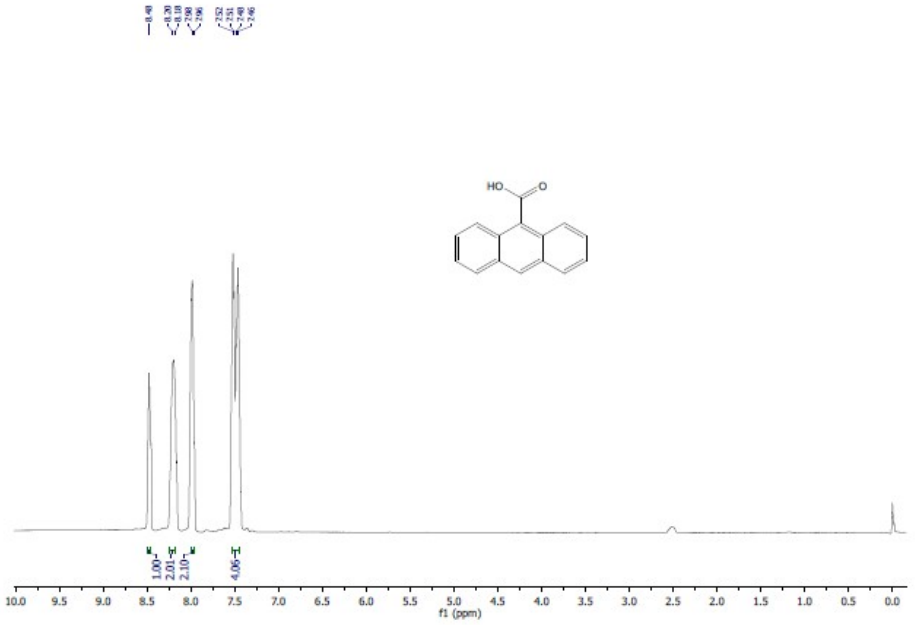

Figure S3: A typical NMR spectrum recorded for 9-Anthracene carboxylic acid extracted and purified from its aqueous micellar solution that was used for the bulk scale eletrocarboxylation.

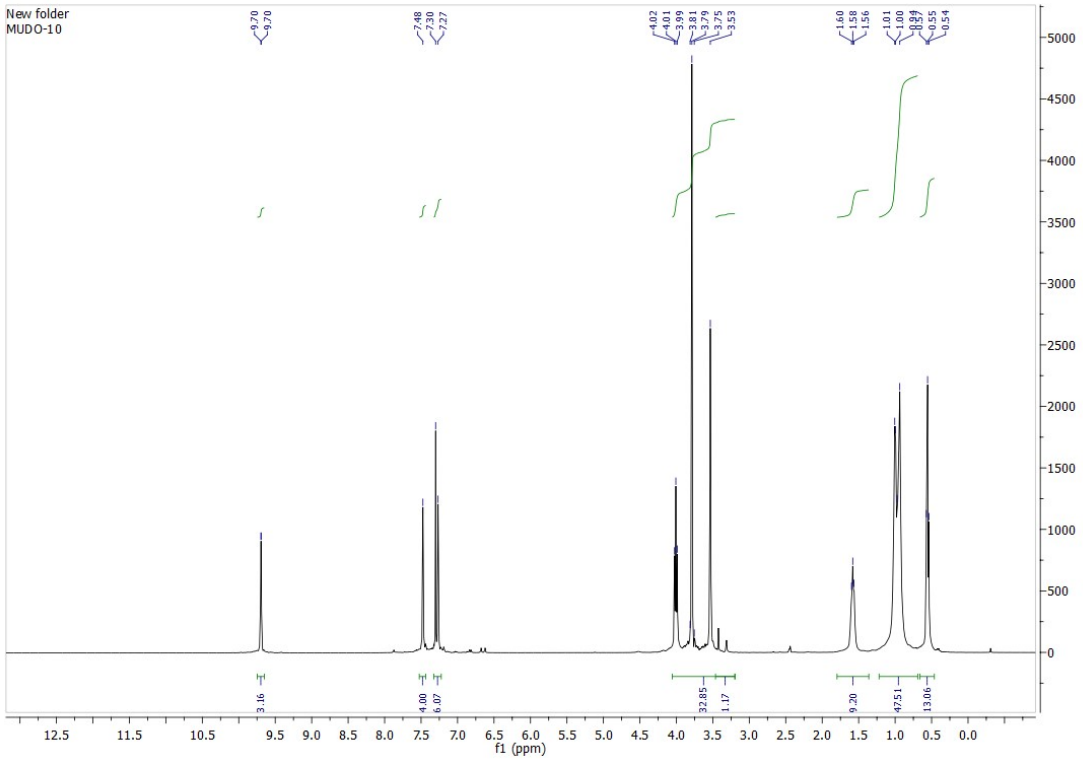

Figure S4: A typical NMR spectrum recorded for a freshly synthesised [DDMIM][Cl] sample.

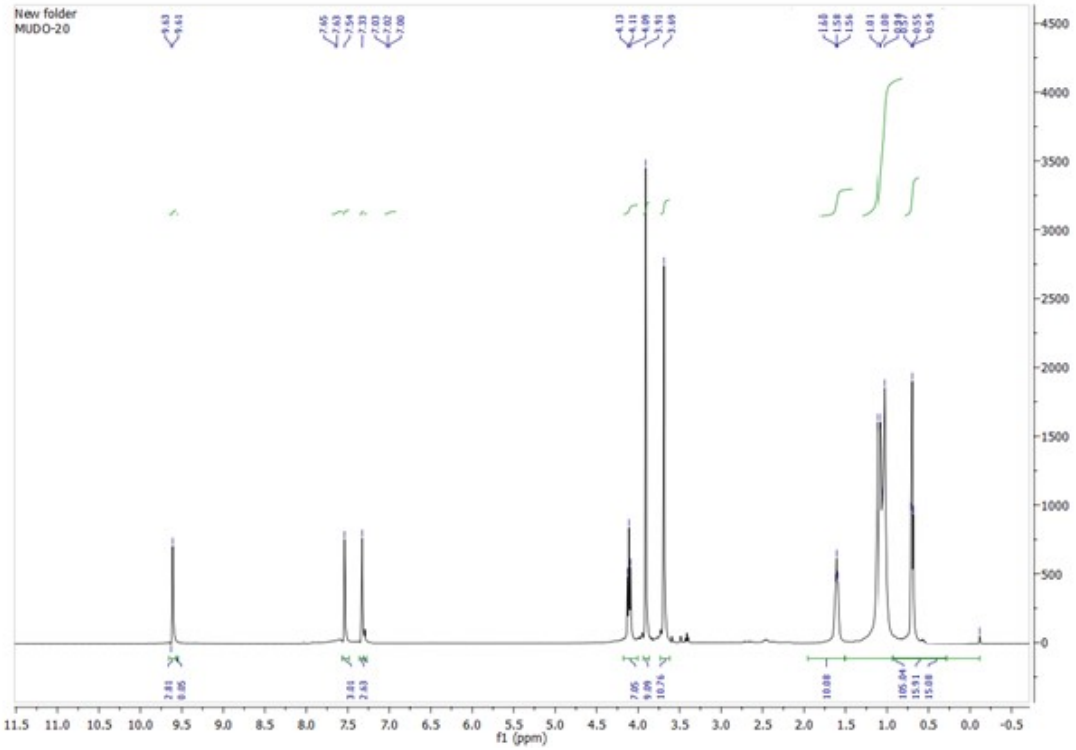

Figure S5: A typical NMR spectrum recorded for a [DDMIM][Cl] sample, extracted and purified from its aqueous micellar solution that was used for the bulk scale eletrocarboxylation.

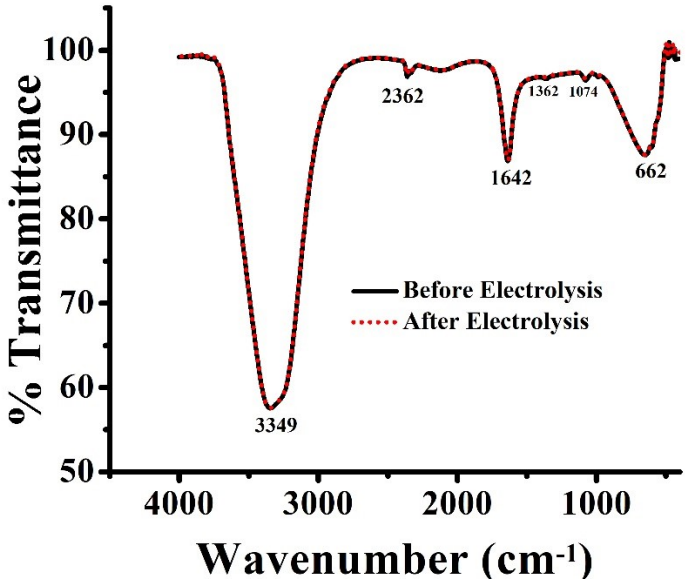

Figure S6: A typical IR spectra recorded for a freshly synthesised [DDMIM][Cl] sample (black trace) and for a [DDMIM][Cl] sample (red dotted trace), extracted and purified from its aqueous micellar solution that was used for the bulk scale eletrocarboxylation.