Supporting Information

Mechanistic Insights into Carbon Dioxide Utilization by Superoxide Ion Generated Electrochemically in Ionic Liquid Electrolyte

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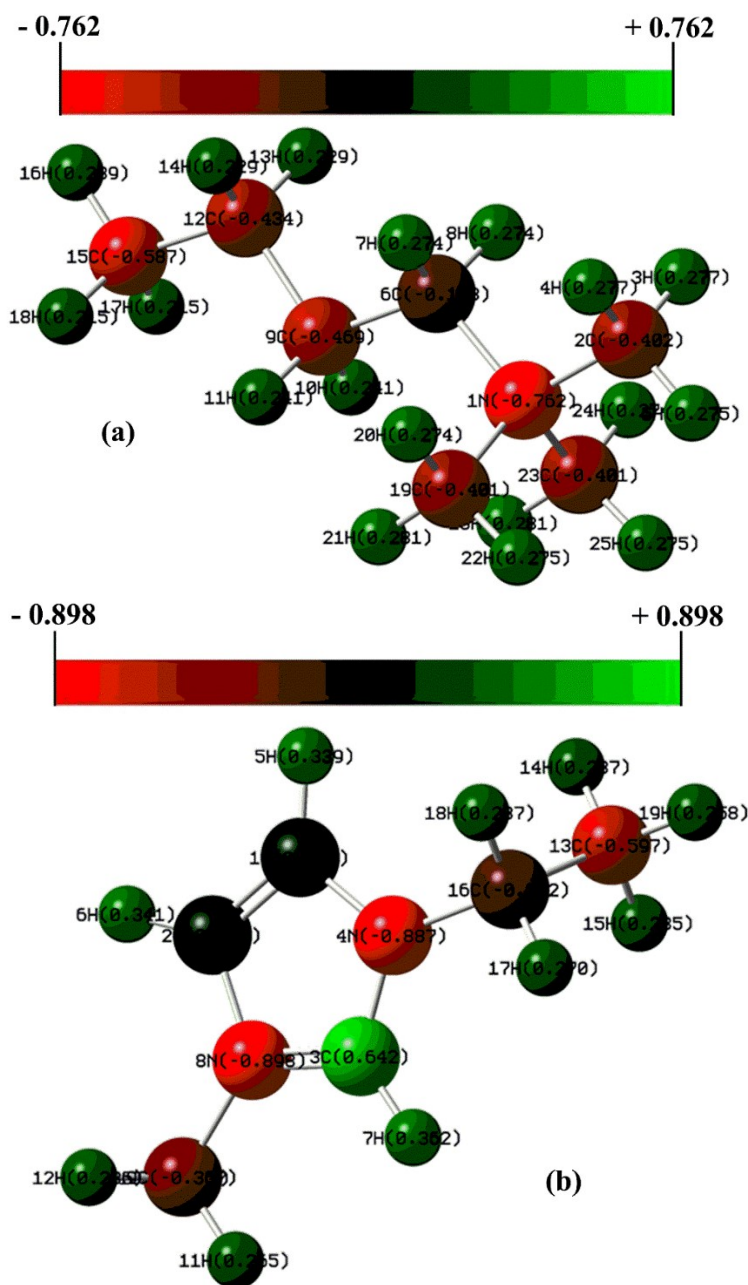[d] *Centre for Carbon Dioxide Capture and Utilization (CCDCU), School of Science and Technology, Sunway University, Bandar Sunway, 47500 Petaling Jaya, Malaysia*
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Table S1: Evidence of irreversibility of $O_2^{\bullet-}/O_2$ using peak separation E_p^c and $E_{p/2}^c$.

ILs	$\left| E_p^c - E_{p/2}^c \right|$					
	9 mV/s	36 mV/s	64 mV/s	81 mV/s	100 mV/s	144 mV/s
[BMAmm$^+$][TFSI$^-$]	89.100	101.400	83.400	85.400	87.500	85.400
[EMIm$^+$][TFSI$^-$]	138.900	135.900	104.500	97.000	95.600	92.400

(a)

(b)

- 1.083   **+ 1.083**

3O(-0.541)

1C(1.083)

2O(-0.541)

(c)

- 0.501   **+ 0.501**

2O(-0.500)

1O(-0.500)

(d)
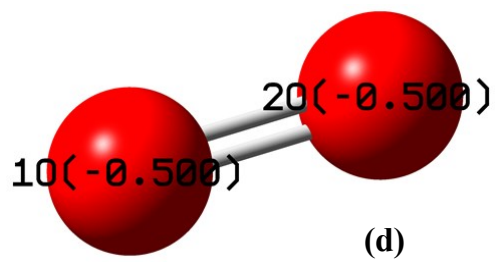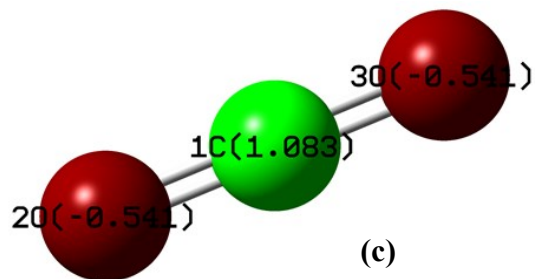
Figure S1: Mulliken atomic charges for (a) [BMAmm$^+$], (b) [EMIm$^+$], (c) CO_2 and (d) $O_2^{\bullet-}$ at Hartree-fock/3-21G level of theory, singlet spin.
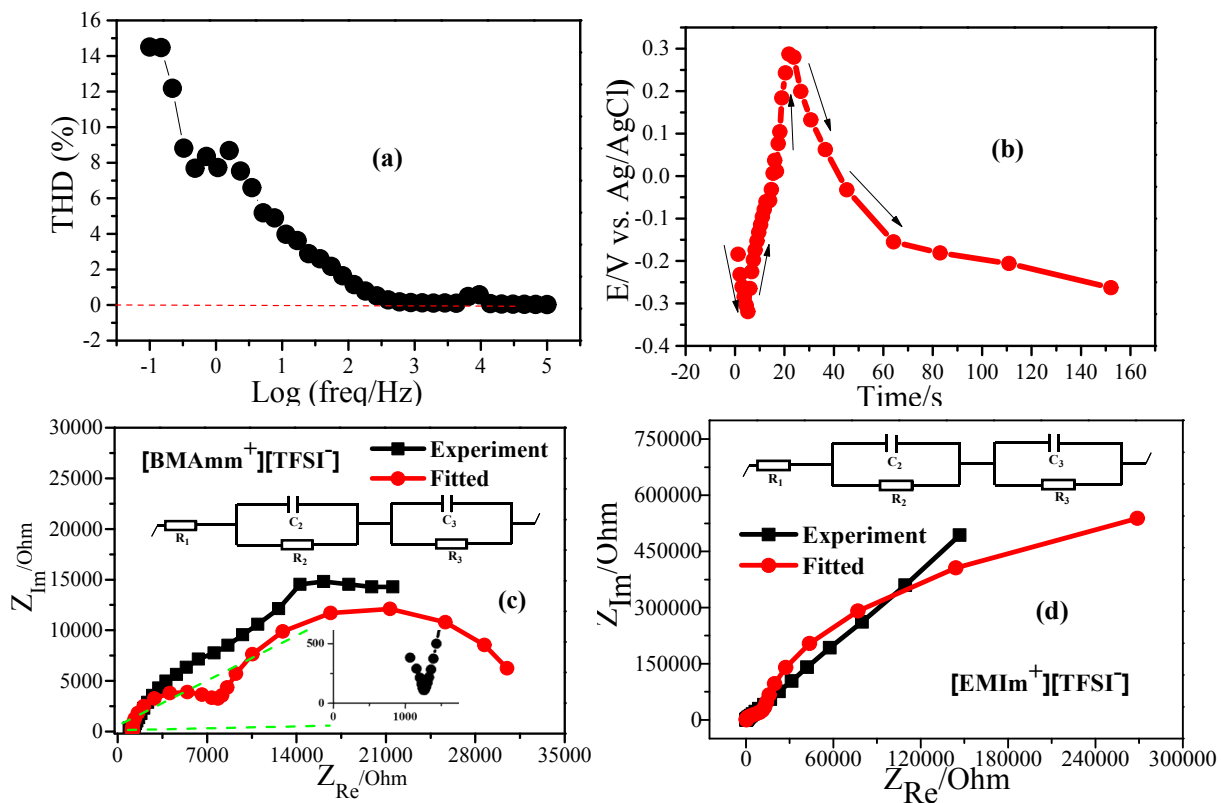
Figure S2: (a) Total harmonic distortion in [BMAmm⁺][TFSI⁻] medium (b) Sinusoid of voltage flow in [BMAmm⁺][TFSI⁻] medium (c) Nyquist plot of [BMAmm⁺][TFSI⁻] medium (d) Nyquist plot of [BMIm⁺][TFSI⁻] medium.