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Supporting information

Enhanced S_2 Emission in Carbazole-Based Ionic Liquids

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Carbazoleimidazolium trifluoromethanesulfonate [CI][OTf]

Carbazoleimidazaolium iodide (CII) (0.5 g, 1 mmol) was dissolve in dicholoromethane (DCM). A saturated solution of sodium trifluoromethanesulfonate (0.19 g, 1.3 mmol) was prepared in water. These two solution were mixed together to perform anion exchange reaction in a biphasic solution. The biphasic solution of DCM and water was stirred for 3-4 days. After 4 days, the lower layer of DCM was separated from water and washed with water several times to remove the by-product (sodium salt of iodide) which was highly soluble in water. DCM was evaporated under high vacuum. After removing DCM, sample was freeze-dried to remove small amounts of water. The product was obtained as yellow solid (0.48 g, 93 % yield).

^{1}H-NMR ($CDCl_3$, 400 MHz): Carbazoleimidazolium cation: δ 9.72 (s, 1H), 8.57 (d, J=2.16 Hz, 1H), 8.19 (d, J= 7.6Hz, 1H), 7.95- 7.77 (m, 2H),7.65 (m, 1H), 7.29 (t, 1H), 4.35 (s, 3H), 3.96 (m, 2H), 1.99 (m, 4H), 1.31-1.16 (m,6H), 0.84-0.76 (m, 6H); ^{19}F-NMR: ($CDCl_3$, 250 MHz) Trifluoromethanesulfonate: δ -79.22.
(MS, ESI^+) m/z 360, (MS, ESI^-) m/z 149

Carbazoleimidazolium bis(trifluoromethylsulfonyl)imide [CI][NTf_2]

Carbazoleimidazaolium iodide (CII) (0.1 g, 0.21 mmol) was anion exchanged with $LiNTf_2$ (0.07 g, 0.24 mmol) followed the same procedure as described above**.** The product was obtained as yellow viscous jelly like liquid (0.1g, 76 % yield).

^{1}H-NMR ($CDCl_3$, 400 MHz): Carbazoleimidazolium cation δ 9.90 (s, 1H), 8.34 (d, J=1.96Hz, 1H),8.19 (d, J= 7.8Hz, 1H), 7.62- 7.56 (m, 2H), 7.54-7.52 (m, 3H), 7.47 (d, J= 8.28 Hz, 1H), 7.32 (t, 1H), 4.22 (s, 3H), 2.34 (m,2H), 1.40 (m, 4H), 1.28-1.26 (m, 6H), 0.95-0.85 (m, 6H).

^{19}F-NMR: ($CDCl_3$, 250 MHz): bis(trifluoromethylsulfonyl)imide: δ -78.78
(MS, ESI^+) m/z 360, (MS, ESI^-) m/z 280

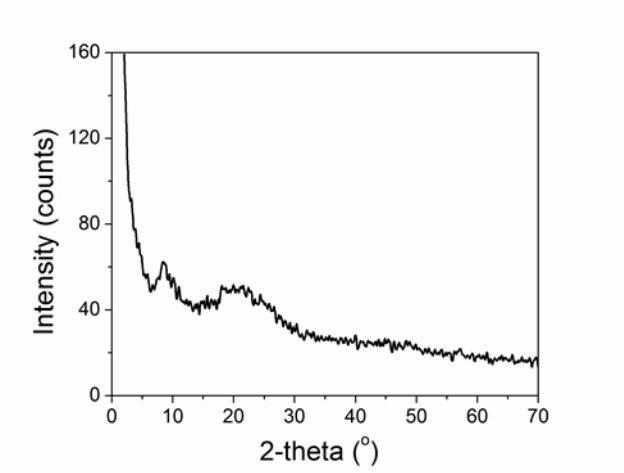

Fig. S1 XRD for [CI][NTf_2]

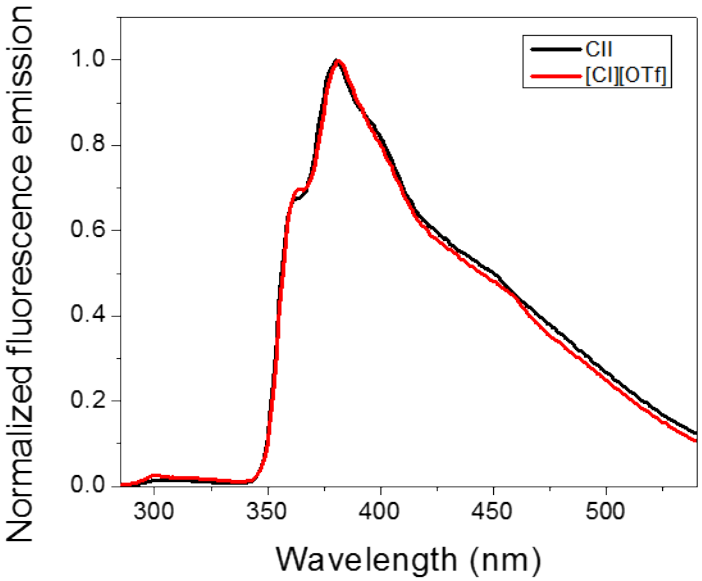

Fig. S2 Normalized fluorescence emission spectra of CII and [CI][OTf] in THF, λ_{ex} 275 nm.

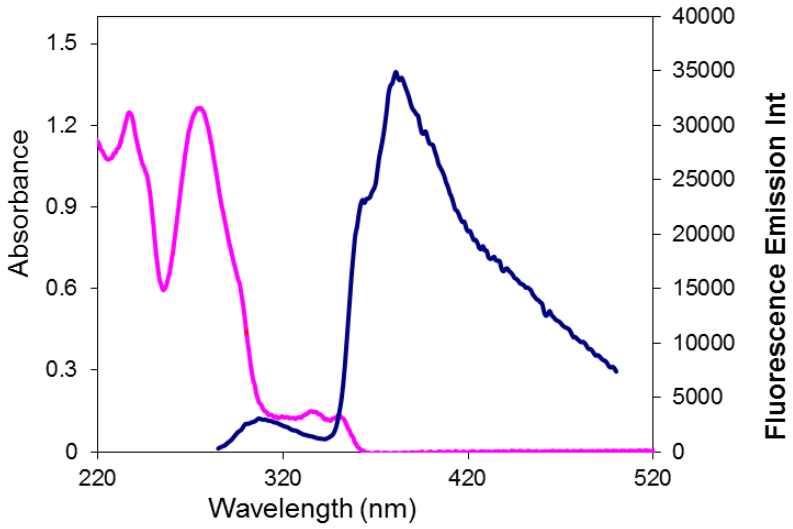

Fig. S3 Fluorescence emission (blue) and absorption (pink) spectra of 3 μM solution of [CI][NTf_2] ionic liquid in THF.