Supporting Information for

A reversible conductivity modulation of azobenzene-based ionic liquids in aqueous solutions by UV/Vis light

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Content

1. ^{1}H NMR spectra of the azobenzene-based ionic liquids and related compounds

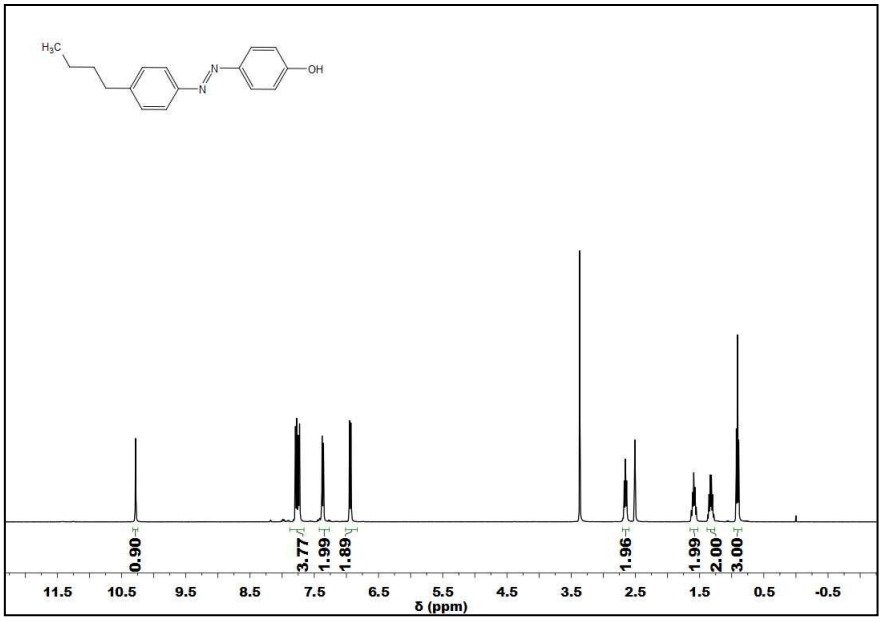

Figure S1. ^{1}H NMR spectrum of C_4Azo

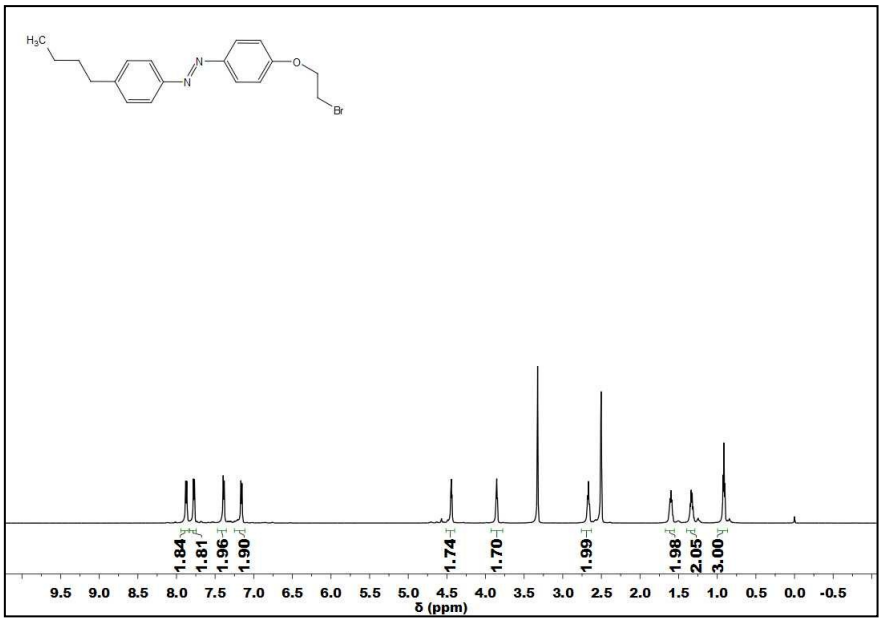

Figure S2. ^{1}H NMR spectrum of C_4AzoC_2Br

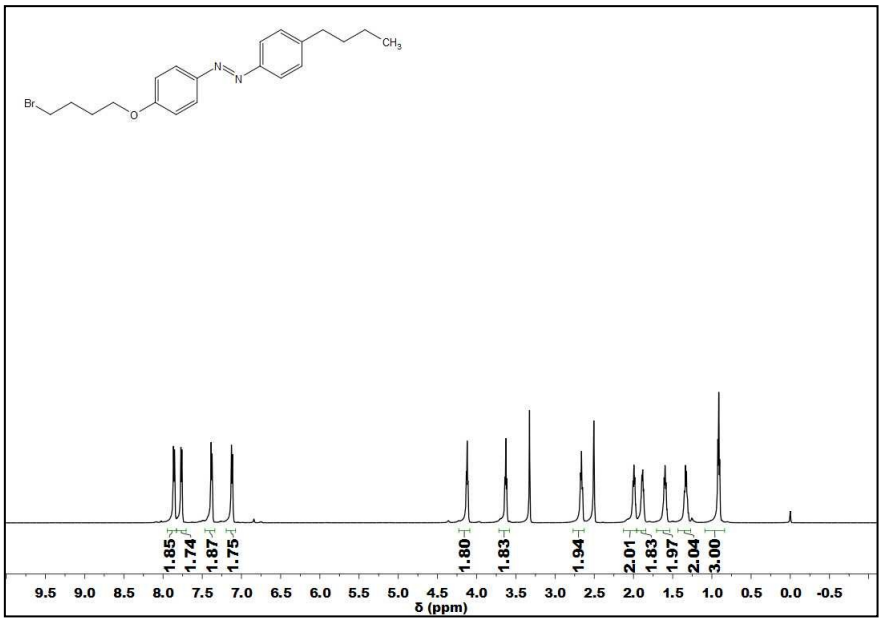

Figure S3. ^{1}H NMR spectrum of C_4AzoC_4Br

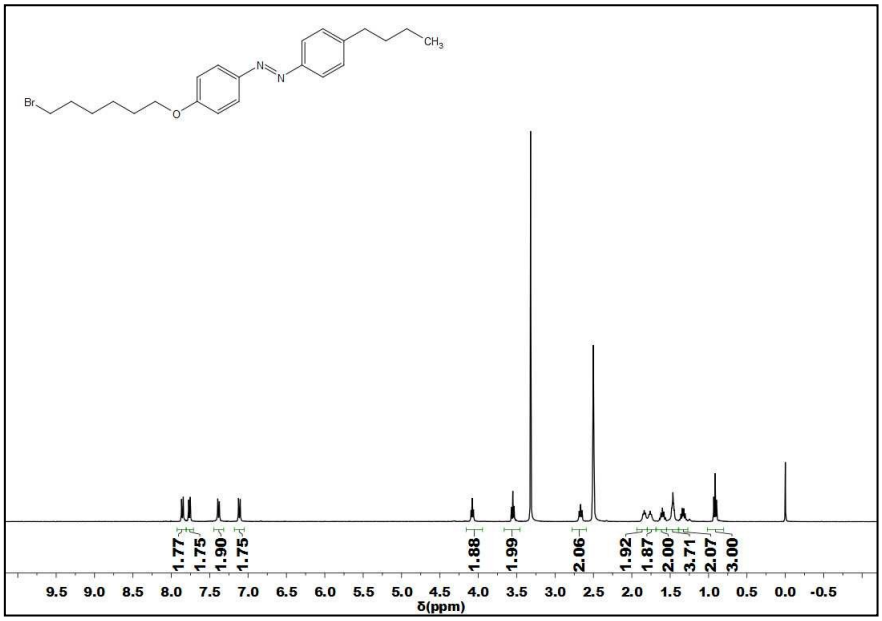

Figure S4. ^{1}H NMR spectrum of C_4AzoC_6Br

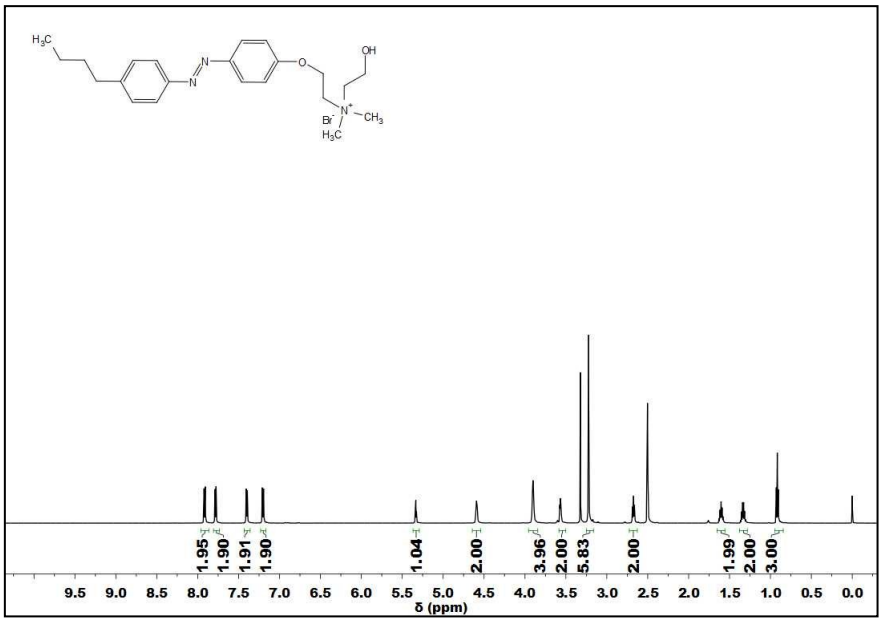

Figure S5. ^{1}H NMR spectrum of [C_4AzoC_2DMEA]Br

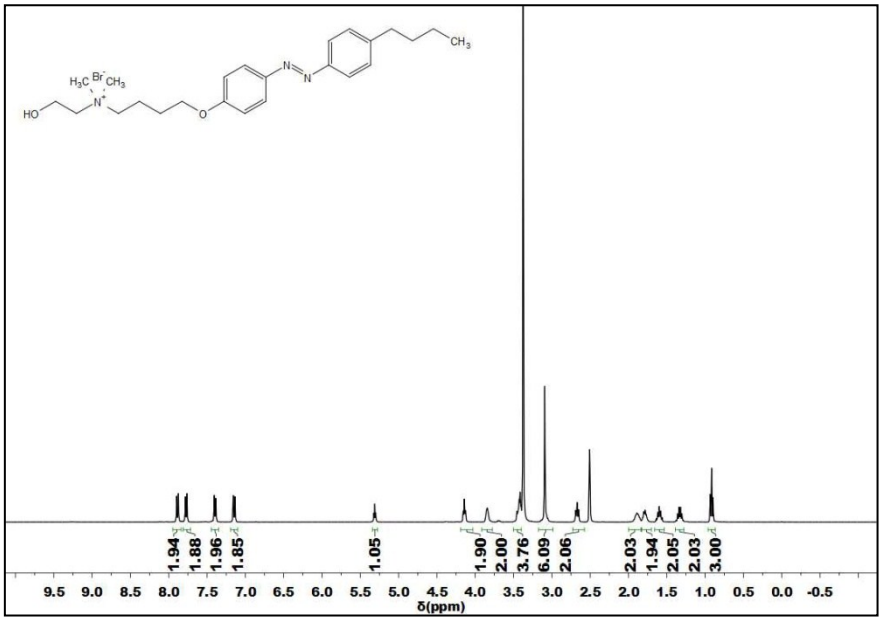

Figure S6. ^{1}H NMR spectrum of [C_4AzoC_4DMEA]Br

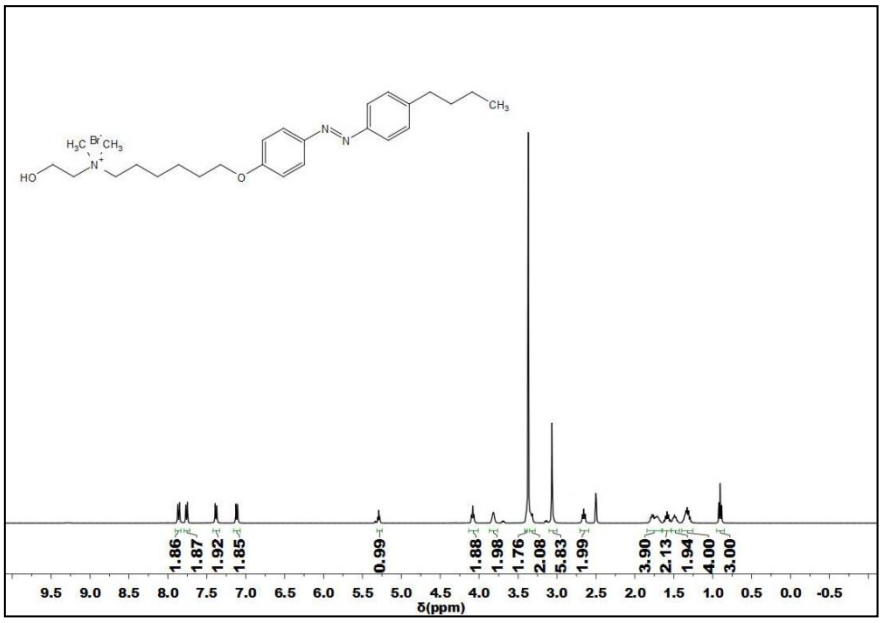

Figure S7. ^{1}H NMR spectrum of [C_4AzoC_6DMEA]Br

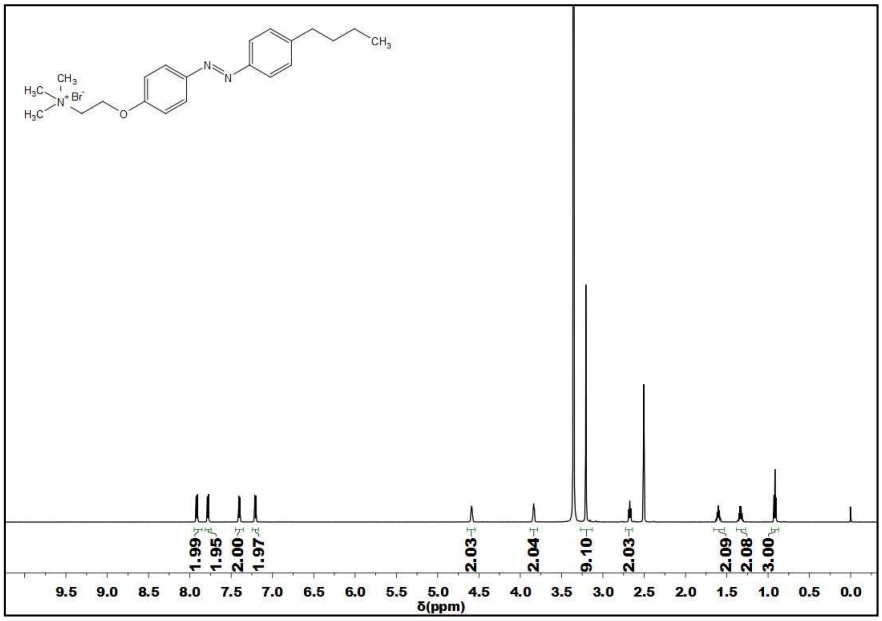

Figure S8. ^{1}H NMR spectrum of [C_4AzoC_2TMA]Br

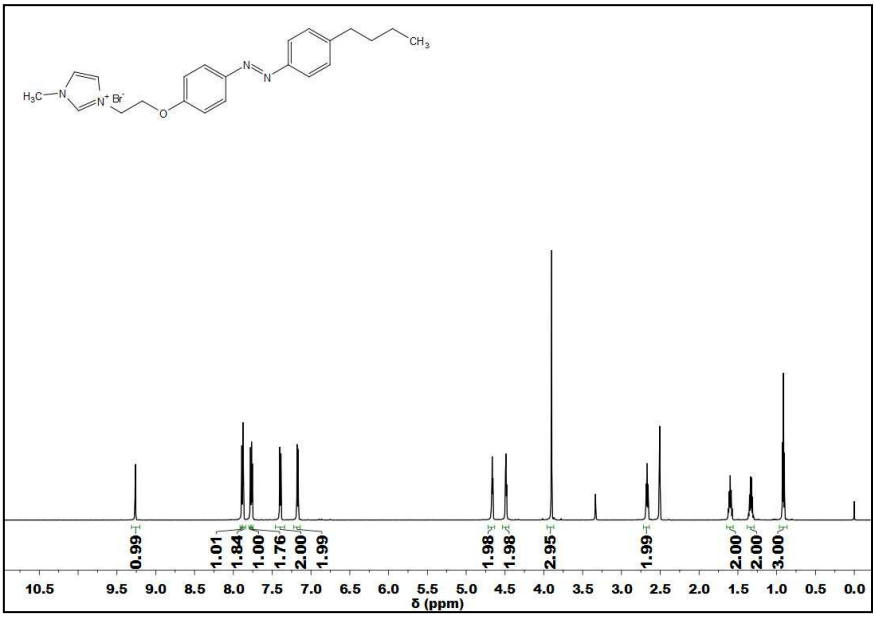

Figure S9. ^{1}H NMR spectrum of [C_4AzoC_2MIM]Br

2. ^{1}H NMR data of the azobenzene-based ionic liquids and related compounds

1. **C_4AzoOH:** ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=10.28(s, 1H, -OH), 7.79(d, 2H, Ph-H), 7.73(d, 2H, Ph-H), 7.38(d, 2H, Ph-H), 6.95(d, 2H, Ph-H), 2.66 (t, 2H, -CH_2), 1.59 (m, 2H, -CH_2), 1.32 (m, 2H, -CH_2), 0.91 (t, 3H, -CH_3) ppm

2. **C_4AzoC_2Br**: ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=7.87(d, 2H, Ph-H), 7.78(d, 2H, Ph-H), 7.38(d, 2H, Ph-H), 7.15(d, 2H, Ph-H), 4.44 (t, 2H, -CH_2), 3.85 (t, 2H, -CH_2), 2.68 (t, 2H, -CH_2), 1.60 (m, 2H, -CH_2), 1.33 (m, 2H, -CH_2), 0.91 (t, 3H, -CH_3) ppm

3. **C_4AzoC_4Br**: ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=7.85(d, 2H, Ph-H), 7.76(d, 2H, Ph-H), 7.37(d, 2H, Ph-H), 7.13(d, 2H, Ph-H), 4.11 (t, 2H, -CH_2), 3.62 (t, 2H, -CH_2), 2.65 (t, 2H, -CH_2), 2.01 (m, 2H, -CH_2), 1.87 (m, 2H, -CH_2), 1.61 (m, 2H, -CH_2), 1.34 (m, 2H, -CH_2), 0.91 (t, 3H, -CH_3) ppm

4. **C_4AzoC_6Br**: ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=7.87(d, 2H, Ph-H), 7.75(d, 2H, Ph-H), 7.40(d, 2H, Ph-H), 7.12(d, 2H, Ph-H), 4.08 (t, 2H, -CH_2), 3.55 (t, 2H, -CH_2), 2.65 (t, 2H, -CH_2), 1.82 (m, 2H, -CH_2), 1.75 (m, 2H, -CH_2), 1.60 (m, 2H, -CH_2), 1.46 (m, 4H, -CH_2), 1.34 (m, 2H, -CH_2), 0.91 (t, 3H, -CH_3) ppm

5. **[C_4AzoC_2DMEA]Br**: ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=7.92(d, 2H, Ph-H), 7.79(d, 2H, Ph-H), 7.41(d, 2H, Ph-H), 7.21(d, 2H, Ph-H), 5.34 (t, 1H, -OH), 4.59 (t, 2H, -CH_2), 3.90

(t, 4H, -CH_2), 3.57 (t, 2H, -CH_2), 3.20 (s, 6H, -CH_3), 2.69 (t, 2H, -CH_2), 1.60 (m, 2H, -CH_2), 1.34 (m, 2H, -CH_2), 0.93 (t, 3H, -CH_3) ppm

6. **[C_4AzoC_4DMEA]Br**: ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=7.87(d, 2H, Ph-H), 7.76(d, 2H, Ph-H), 7.41(d, 2H, Ph-H), 7.16(d, 2H, Ph-H), 5.31 (t, 1H, -OH), 4.16 (t, 2H, -CH_2), 3.84 (t, 2H, -CH_2), 3.41 (t, 4H, -CH_2), 3.09 (s, 6H, -CH_3), 2.67 (t, 2H, -CH_2), 1.87 (m, 2H, -CH_2), 1.80 (m, 2H, -CH_2), 1.64 (m, 2H, -CH_2), 1.34 (m, 2H, -CH_2), 0.93 (t, 3H, -CH_3) ppm

7. **[C_4AzoC_6DMEA]Br**: ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=7.85(d, 2H, benzene ring-H), 7.75(d, 2H, benzene ring-H), 7.39(d, 2H, benzene ring-H), 7.13(d, 2H, benzene ring-H), 5.30 (t, 1H, -OH), 4.08 (t, 2H, -CH_2), 3.82 (m, 2H, -CH_2), 3.40 (m, 2H, -CH_2), 3.32 (m, 2H, -CH_2), 3.07 (s, 6H, -NCH_3), 2.66 (t, 2H, -CH_2), 1.78 (m, 4H, -CH_2), 1.59 (m, 2H, -CH_2), 1.47 (m, 2H, -CH_2), 1.31 (m, 4H, -CH_2), 0.90 (t, 3H, -CH_3) ppm

8. **[C_4AzoC_2TMA]Br**: ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=7.91(d, 2H, Ph-H), 7.78(d, 2H, Ph-H), 7.41(d, 2H, Ph-H), 7.22(d, 2H, Ph-H), 4.59 (t, 2H, -CH_2), 3.85 (t, 2H, -CH_2), 3.20 (s, 9H, -CH_3), 2.67 (m, 2H, -CH_2), 1.60 (m, 2H, -CH_2), 1.33 (m, 2H, -CH_2), 0.91 (t, 3H, -CH_3) ppm

9. **[C_4AzoC_2MIM]Br**: ^{1}H NMR (400MHz, DMSO-d_6, TMS): δ=9.26(s, 1H, imidazole ring-H), 7.89(t, 2H, Ph-H, and 1H, imidazole ring-H), 7.78(t, 2H, Ph-H, and 1H, imidazole ring-H), 7.40(d, 2H, Ph-H), 7.18(d, 2H, Ph-H), 4.67 (t, 2H, -CH_2), 4.49 (t, 2H, -CH_2), 3.90(s, 3H,-NCH_3), 2.67 (t, 2H, -CH_2), 1.61 (m, 2H, -CH_2), 1.34 (m, 2H, -CH_2), 0.93 (t, 3H, -CH_3) ppm

3. UV-vis spectra for 0.01 mol·kg^{-1} of the ionic liquids in aqueous solution

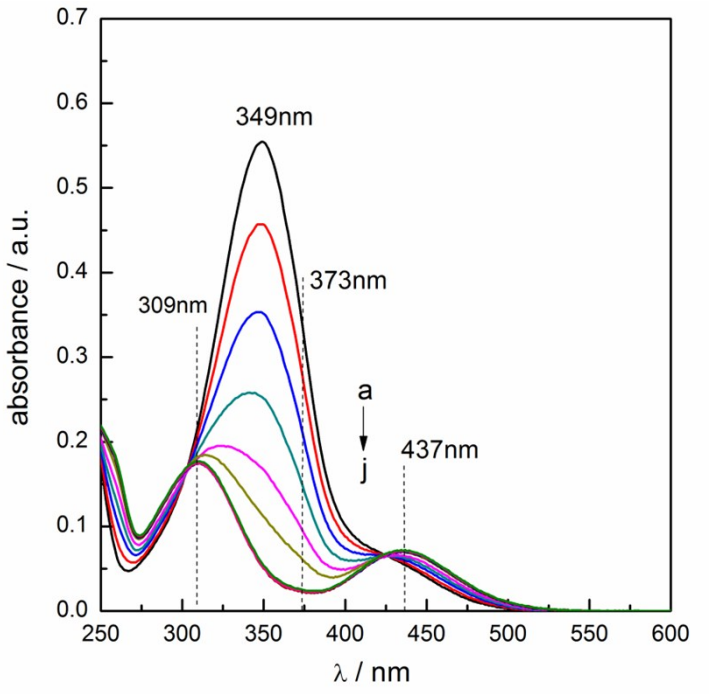

Figure S10. UV-vis spectra for aqueous solution of 0.01 mol·kg^{-1} [C_4AzoC_2TMA]Br after different UV irradiation time at 25.0°C: a, initial state; b, 2min; c, 4 min; d, 6 min; e, 8 min; f, 10 min; g, 15 min; h, 20 min; i, 40min; j, 60min.

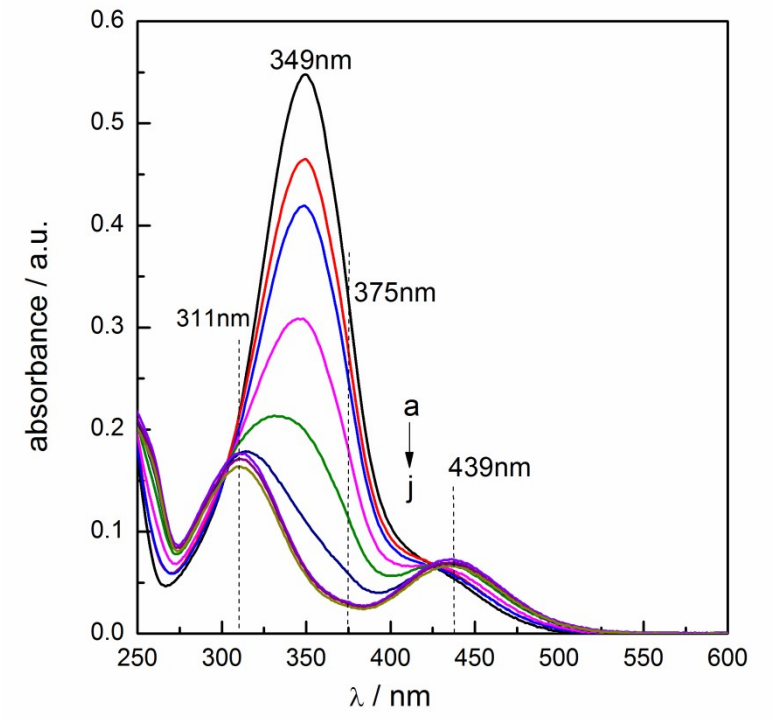

Figure S11. UV-vis spectra for aqueous solution of 0.01 mol·kg^{-1} [C_4AzoC_2MIM]Br after different UV irradiation time at 25.0°C: a, initial state; b, 2min; c, 4 min; d, 6 min; e, 8 min; f, 10 min; g, 15 min; h, 20 min; i, 40min; j, 60min.

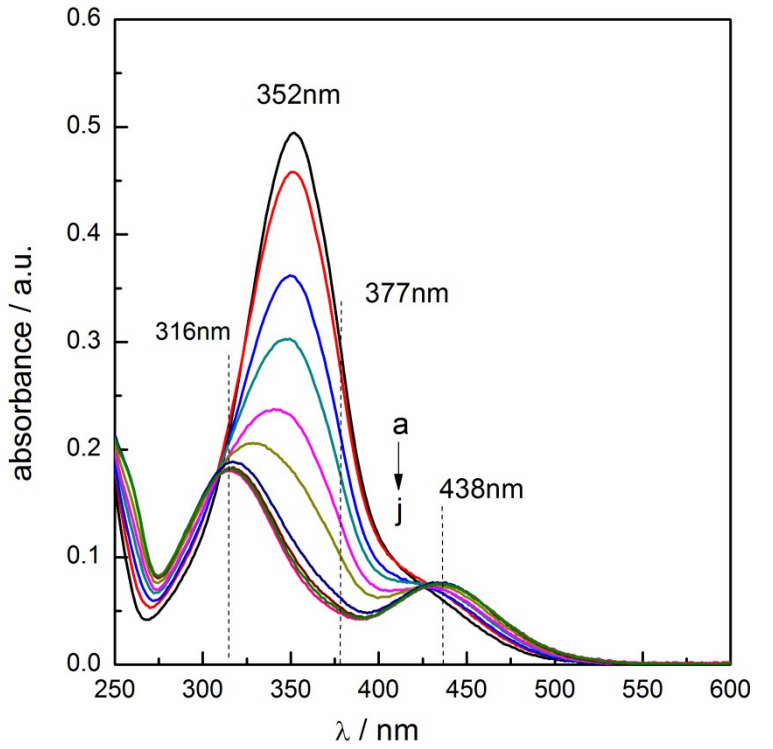

Figure S12. UV-vis spectra for aqueous solution of 0.01 mol·kg^{-1} [C_4AzoC_4DMEA]Br after different UV irradiation time at 25.0°C: a, initial state; b, 2min; c, 4 min; d, 6 min; e, 8 min; f, 10 min; g, 15 min; h, 20 min; i, 40min; j, 60min.

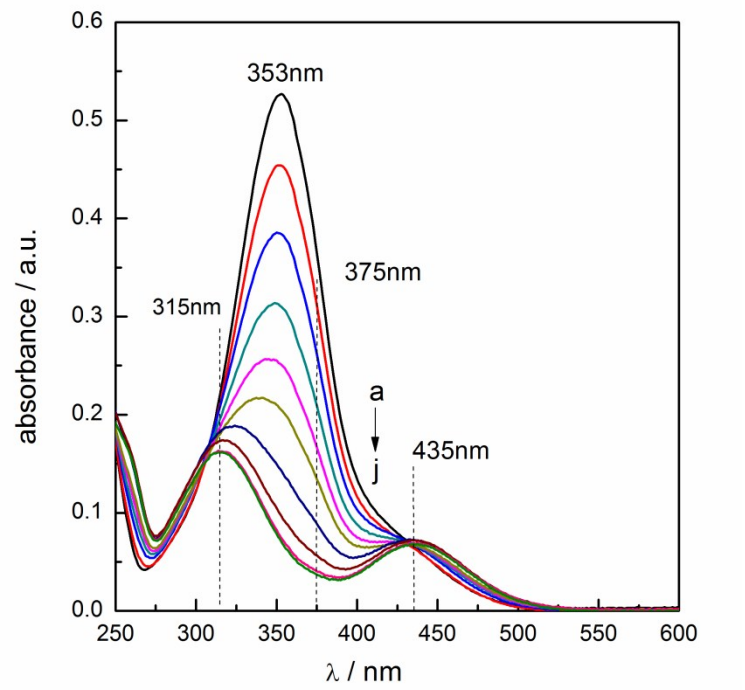

Figure S13. UV-vis spectra for aqueous solution of 0.01 mol·kg^{-1} [C_4AzoC_6DMEA]Br after different UV irradiation time at 25.0°C: a, initial state; b, 2min; c, 4 min; d, 6 min; e, 8 min; f, 10 min; g, 15 min; h, 20 min; i, 40min; j, 60min.