Facile and Greener One Pot Synthesis of Zinc Sulphide Quantum Dots Employing Zinc based Ionic Liquids and their Photocatalytic Activity

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Supporting Information

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Annexure S1: Characterization of [C₄mim][ZnCl₃] ILs

1H NMR and mass spectroscopy data for synthesized MILs:

[C₄mim][ZnCl₃]: 1H NMR (500 MHz, 10% D₂O and 90% H₂O, δ-ppm) 0.89 (t, 3H, CH₃), 1.284 ( m, 2H, (-CH₂-CH₃)), 1.815 (q, 2H, (N⁺-CH₂- CH₂-)), 3.858 (s, 3H, N-CH₃), 4.16 (t, 3H, N⁺-CH₂-CH₂-), 7.40 (s, 1H, N-CH-CH-N⁺), 7.44 (s, 1H, N-CH-CH-N⁺), 8.67 (s, 1H, N-CH-N⁺). ESI-HRMS positive ions m/z (for C₈H₁₅N₂⁺): 139.1155, 140.1185 and negative ions m/z (for ZnCl₃⁻): 170.8129, 172.8108, 168.8162, 176.8061

[C₈mim][ZnCl₃]: 1H NMR (500 MHz, 10% D₂O and 90% H₂O, δ-ppm) 0.88 (t, 3H, CH₃), 1.89 (q, 2H, (N⁺-CH₂- CH₂-)), 3.91 (s, 3H, N-CH₃), 4.21 (t, 3H, N⁺-CH₂-CH₂-), 7.45 (s, 1H, N-CH-CH-N⁺), 7.50 (s, 1H, N-CH-CH-N⁺), 8.73 (s, 1H, N-CH-N⁺). ESI-HRMS positive ions m/z (for C₁₂H₂₃N₂⁺): 195.1807, 196.1837 and negative ions m/z for ZnCl₃⁻: 170.6735, 172.6691, 168.6781, 174.6655, 174.6604.

[C₁₆mim][ZnCl₃]: 1H NMR (500 MHz, 10% D₂O and 90% H₂O, δ-ppm) 0.88 (t, 3H, CH₃), 1.92 (q, 2H, (N⁺-CH₂- CH₂-)), 3.98 (s, 3H, N-CH₃), 4.30 (t, 3H, N⁺-CH₂-CH₂-), 7.58 (s, 1H, N-CH-CH-N⁺), 7.62 (s, 1H, N-CH-CH-N⁺), 9.04 (s, 1H, N-CH-N⁺). ESI-HRMS positive ions m/z (for C₂₀H₃₉N₂⁺): 307.2998, 308.3025 and negative ions m/z for ZnCl₃⁻: 170.8131, 172.8103, 168.8161, 174.8075, 174.8057.
Figure S1: $^1$H NMR spectra of [C$_4$mim][ZnCl$_3$].

Figure S2: $^1$H NMR spectra of [C$_8$mim][ZnCl$_3$].
Figure S3: $^1$H NMR spectra of [C$_{16}$mim][ZnCl$_3$].

Figure S4: Electrospray ionisation (ESI) mass spectra of (A) anion of [C$_4$mim][ZnCl$_3$]; and (B) cation of [C$_4$mim][ZnCl$_3$].
Figure S5: Electrospray ionisation (ESI) mass spectra of (A) anion of [C₈mim][ZnCl₃]; and (B) cation of [C₈mim][ZnCl₃].

Figure S6: Electrospray ionisation (ESI) mass spectra of (A) anion of [C₁₆mim][ZnCl₃]; and (B) cation of [C₁₆mim][ZnCl₃].
Figure S7: FT-IR spectra of synthesized QDs.

Figure S8: HR-TEM image of QD-ZnCl$_2$. 
Figure S9: HR-TEM image of QD-C4.

Figure S10: HR-TEM image of QD-C8.
Figure S11: HR-TEM image of QD-C16.