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Counterion dependent hydrogelation of amino acid-based amphiphiles: switching from non-gelators to gelators and facile synthesis of silver nanoparticles

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Synthesis of 1a. This amphiphile was prepared following the same protocol as described in our previous report.[4] Briefly, Boc-protected L-tryptophan was coupled with *n*-hexadecylamine using dicyclohexylcarbodiimide (DCC, 1 equivalent) and catalytic amount of 4-*N*,*N*-(dimethyl) aminopyridine (DMAP) in presence of 1 equivalent of 1-hydroxybenztriazole (HOBT) in dry DCM. Boc-protected amide was then purified through column chromatography using 60-120 mesh silica gel and acetone/hexane as the eluent. Amide was then subjected to deprotection by Trifluoroacetic acid (TFA, 4 equivalents) in dry DCM. After 2h of stirring, solvents were removed on a rotary evaporator and the mixture was taken in ethyl acetate. The EtOAc part was thoroughly washed with aqueous 10% sodium carbonate solution followed by brine to neutrality. The organic part was dried over anhydrous sodium sulphate and concentrated to get the corresponding amine. The primary amine (1 equivalent) thus obtained was quaternized with excess methyl iodide using 2.2 equivalent anhydrous potassium carbonate and catalytic amount of 18-crown-6-ether in dry DMF for 2h. The reaction mixture was taken in ethyl acetate and washed with aqueous thiosulphate solution and water, respectively. The concentrated ethyl acetate part was then subjected to column chromatography using 60-120 mesh silica gel and methanol/chloroform as the eluent. Finally, it was crystallized from methanol/ether to obtain solid quaternized iodide salt, which was subjected to ion exchange on Amberlyst A-26 chloride ion exchange resin column to get the pure chloride (**1a**). Overall yield was ~60%. The surfactants **2a**, **3a**, **4a**, **5a**, **6a**, and **7a** were prepared following same experimental procedure.

Syntheses of Surfactants. The surfactants (**1b-h**) were prepared by using ion-exchange procedure. A hydroxide ion-exchange column was made with Dowex 1×8-400. This column was activated by passing 300 mL 2N sodium hydroxide solution and followed by washing with water (2L) and methanol (0.5L). Three times recrystallized **1a** (1 gm) dissolved in minimum

volume of methanol was then loaded on the column and the corresponding hydroxide form was collected as eluent by passing methanol slowly through this column. This methanolic solution of the hydroxide form was concentrated in a rotary evaporator to about 5 mL and to it 20 mL of distilled water was added. Then the solution was neutralized with equivalent amount of acid and allowed to stir for an hour. The solution was again concentrated in the rotary evaporator to ensure that no traces of methanol were present. The resulting solution was then lyophilized to obtain the surfactant with desired counter ion. The yield of the product was ~ 80-85%. The surfactants **2b-h**, **3b-h**, **4b-h**, **5b-h**, **6b-h**, and **7b-h** were prepared following similar synthetic methodologies.

All the compounds of the series **1** have same quaternary ammonium cation. So, *m/z* values are same for all the compounds in this series and hence the value of **1a** is only given.

Compound 1a: $[\alpha]^{23}_{D}$ -29.3 (c 3.8 in $CHCl_3$); (Found: C, 71.28; H, 10.43; N, 8.35. Calcd (%) for $C_{30}H_{52}N_3OCl$: C, 71.18; H, 10.35; N, 8.30.); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.83 (3H, t, CH_3), 0.97-0.99 (2H, br, CH_2CH_3), 1.11-1.32 (24H, br, $(CH_2)_{12}CH_2CH_3$), 1.66-1.73 (2H, br, $NHCH_2CH_2$), 2.82-2.91 (2H, m, $COCH(NMe_3)CH_2$), 3.2-3.24 (2H, m, $NHCH_2$), 3.31 (9H, s, NMe_3) 5.60 (1H, br, NHCOCH), 7.01-7.06 (1H, br, NHCH=), 7.29-7.31 (2H, d, =CHCH=), 7.41 (1H, d, NHC(=C)CH), 7.48-7.51 (1H, d, NHC=CCH), 8.02 (1H, br, CONH), 8.39 (1H, s, CNHC); MS (ESI): *m/z* calcd for $C_{30}H_{52}N_3O$ (the 4° ammonium ion, 100%): 470.411, found 470.3679 [M^+].

Compound 1b: $[\alpha]^{23}_{D}$ -23.5 (c 3.8 in $CHCl_3$); (Found: C, 71.99; H, 10.85; N, 7.15. Calcd (%) for $C_{32}H_{55}N_3O_3$ (1 mol% crystal water): C, 70.16; H, 10.49; N, 7.67); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.83 (3H, t, CH_3), 0.94-1.05 (2H, br, CH_2CH_3) 1.23-1.40 (24H, br, $(CH_2)_{12}CH_2CH_3$), 1.69 (2H, br, $NHCH_2CH_2$), 1.96 (3H, s, CH_3COO), 2.92-3.01 (2H, m, $COCH(NMe_3)CH_2$), 3.23-

3.28 (2H, m, NHC*H*$_2$), 3.38 (9H, s, NMe$_3$), 5.82 (1H, br, NHCOC*H*), 7.07-7.17 (1H, br, NHC*H*=), 7.32-7.34 (2H, d, =C*H*C*H*=), 7.43 (1H, s, NHC(=C)C*H*), 7.54-7.57 (1H, d, NHC=CC*H*), 8.73 (1H, br, CONH), 9.84 (1H, s, CNHC).

Compound 1c: $[\alpha]^{23}_D$ -15 (3.5 in $CHCl_3$); (Found: C, 71.38; H, 10.70; N, 7.25. Calcd (%) for $C_{36}H_{63}N_3O_3$ (1 mol% crystal water): C, 71.60; H, 10.85; N, 6.96); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.91 (6H, t, 2CH$_3$,), 0.98-1.05 (4H, br, C*H*$_2$CH$_3$ and C*H*$_2$CH$_3$) 1.21-1.25 (28H, br, (C*H*$_2$)$_{12}$CH$_2$CH$_3$ and (C*H*$_2$)$_2$CH$_2$COO) 1.48-1.58 (4H, br, NHCH$_2$C*H*$_2$ and C*H*$_2$COO), 2.88-3.0 (2H, m, COCH(NMe$_3$)C*H*$_2$), 3.29-3.3 (2H, m, NHC*H*$_2$), 3.46 (9H, s, NMe$_3$) 5.91 (1H, br, NHCOC*H*), 7.11-7.16 (1H, br, NHC*H*=), 7.19-7.21 (2H, d, =C*H*C*H*=), 7.34-7.37 (1H, d, NHC(=C)C*H*), 7.57-7.59 (1H, d, NHC=CC*H*), 7.95 (1H, br, CONH), 8.34 (1H, s, CNHC).

Compound 1d: $[\alpha]^{23}_D$ -23 (c 3.2 in $CHCl_3$); (Found: C, 59.13; H, 8.46; N, 6.42. Calcd (%) for $C_{32}H_{52}N_3O_3Cl_3$ (1 mol% crystal water): C, 59.03; H, 8.36; N, 6.45); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.87 (3H, t, CH$_3$), 0.91-1.03 (2H, br, C*H*$_2$CH$_3$), 1.23-1.44 (24H, br, (C*H*$_2$)$_{12}$CH$_2$CH$_3$), 1.67 (2H, br, NHCH$_2$C*H*$_2$), 2.91-2.97 (2H, m, COCH(NMe$_3$)C*H*$_2$), 3.24-3.28 (2H, m, NHC*H*$_2$), 3.37 (9H, s, NMe$_3$) 5.72 (1H, br, NHCOC*H*), 7.06-7.16 (1H, br, NHC*H*=), 7.34-7.37 (2H, d, =C*H*C*H*=), 7.43 (1H, s, NHC(=C)C*H*), 7.53-7.56 (1H, d, NHC=CC*H*), 8.73 (1H, br, CONH), 8.88 (1H, s, CNHC).

Compound 1e: $[\alpha]^{23}_D$ -33 (c 4.5 in $CHCl_3$); (Found: C, 75.43; H, 10.14; N, 7.05. Calcd (%) for $C_{38}H_{59}N_3O_3$ (1 mol% crystal water): C, 73.15; H, 9.85; N, 6.73); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH$_3$), 0.97-1.03 (2H, br, C*H*$_2$CH$_3$), 1.25-1.35 (24H, br, (C*H*$_2$)$_{12}$CH$_2$CH$_3$), 1.42-1.56 (2H, br, NHCH$_2$C*H*$_2$), 2.81-2.97 (2H, m, COCH(NMe$_3$)C*H*$_2$), 3.27-3.33 (2H, m, NHC*H*$_2$), 3.37 (9H, s, NMe$_3$), 3.64 (2H, s, CH$_2$COO), 5.61 (1H, br, NHCOC*H*), 7.08-7.19 (1H,

br, NHC*H*=), 7.29-7.38 (5H, m, Ph), 7.46-7.55 (2H, m, =C*H*C*H*=), 7.57 (1H, s, NHC(=C)C*H*), 7.61-7.87 (1H, d, NHC=CC*H*), 7.89 (1H, br, CONH), 8.65 (1H, s, CNHC).

Compound 1f: $[\alpha]^{23}_{D}$ -23 (c 4.2 in $CHCl_3$); (Found: C, 74.65; H, 9.31; N, 6.21. Calcd (%) for $C_{42}H_{61}N_3O_3$ (1 mol% crystal water): C, 74.85; H, 9.42; N, 6.23); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.97-1.03 (2H, br, C*H*$_2$CH$_3$), 1.25-1.38 (24H, br, (C*H*$_2$)$_{12}$CH$_2$CH$_3$), 1.46-1.56 (2H, br, NHCH$_2$C*H*$_2$), 2.81-2.9 (2H, m, COCH(NMe$_3$)C*H*$_2$), 3.22-3.28 (2H, m, NHC*H*$_2$), 3.46 (9H, s, NMe$_3$), 4.09 (2H, s, CH$_2$COO), 5.58 (1H, br, NHCOC*H*), 7.08-7.60 (12H, m, all aromatic CH), 7.87 (1H, br, CONH), 8.69 (1H, s, CNHC).

Compound 1g: $[\alpha]^{23}_{D}$ -23 (c 4.7 in $CHCl_3$); (Found: C, 72.67; H, 10.09; N, 7.06. Calcd (%) for $C_{37}H_{57}N_3O_3$ (1 mol% crystal water): C, 72.87; H, 9.75; N, 6.89); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.83 (3H, t, CH_3), 0.88-0.99 (2H, br, C*H*$_2$CH$_3$), 1.18-1.29 (24H, br, (C*H*$_2$)$_{12}$CH$_2$CH$_3$), 1.49-1.64 (2H, br, NHCH$_2$C*H*$_2$), 2.71-2.97 (2H, m, COCH(NMe$_3$)C*H*$_2$), 3.17-3.25 (2H, m, NHC*H*$_2$), 3.42 (9H, s, NMe$_3$), 5.79 (1H, br, NHCOC*H*), 7.03-8.02 (10H, m, all aromatic CH), 8.45 (1H, s, CONH), 8.87 (1H, s, CNHC).

Compound 1h: $[\alpha]^{23}_{D}$ -37.6 (c 4.9 in $CHCl_3$); (Found: C, 70.67; H, 10.01; N, 6.86. Calcd (%) for $C_{37}H_{57}N_3O_4$ (1 mol% crystal water): C, 71.0; H, 9.5; N, 6.71); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.87 (3H, t, CH_3), 0.97-1.01 (2H, br, C*H*$_2$CH$_3$), 1.24-1.37 (24H, br, (C*H*$_2$)$_{12}$CH$_2$CH$_3$), 1.56-1.69 (2H, br, NHCH$_2$C*H*$_2$), 2.88-2.96 (2H, m, COCH(NMe$_3$)C*H*$_2$), 3.3-3.39 (2H, m, NHC*H*$_2$), 3.47 (9H, s, NMe$_3$), 5.32 (1H, br, NHCOC*H*), 6.8-7.89 (9H, m, all aromatic CH), 8.68 (1H, s, CONH), 9.32 (1H, s, CNHC).

All the compounds of the series **2** have same quaternary ammonium cation. So, *m/z* values are same for all the compounds in this series and hence the value of **2a** is only given.

Compound 2a: $[\alpha]^{23}_{D}$ +15.1 (c 2.02 in $CHCl_3$); (Found: C, 71.72; H, 11.09; N, 5.92.Calcd (%) for $C_{28}H_{51}N_2OCl$: C, 71.99; H, 11.00; N, 6.00.); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.80 (3H, t, CH_3), 1.08-1.18 (28H, br, $(CH_2)_{14}CH_3$), 2.82-2.86 (2H, m, $COCH(NMe_3)CH_2$), 3.15-3.18 (2H, m, $NHCH_2$), 3.4 (9H, s, NMe_3), 5.63-5.68 (1H, t, NHCOC*H*), 7.18-7.26 (5H, m, Ph), 8.68 (1H, s, CONH); MS (ESI) *m/z* calcd for $C_{28}H_{51}N_2O$ (the 4° ammonium ion, 100%): 431.4001, found 431.2771 [M^+].

Compound 2b: $[\alpha]^{23}_{D}$ +13.1 (c 5.1 in $CHCl_3$); (Found: C, 70.67; H, 10.95; N, 5.46. Calcd (%) for $C_{30}H_{54}N_2O_3$ (1 mol% crystal water): C, 70.82; H, 11.09; N, 5.51); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.84 (3H, t, CH_3), 0.99-1.24 (28H, br, $(CH_2)_{14}CH_3$), 1.88 (3H, s, CH_3COO), 2.87-2.93 (2H, m, $COCH(NMe_3)CH_2$), 3.07-3.21 (2H, m, $NHCH_2$), 3.43 (9H, s, NMe_3), 5.76 (1H, t, NHCOC*H*), 7.26-7.32 (5H, m, Ph), 8.97 (1H, s, CONH).

Compound 2c: $[\alpha]^{23}_{D}$ +8.6 (c 4.6 in $CHCl_3$); (Found: C, 72.11; H, 11.32; N, 4.92. Calcd (%) for $C_{34}H_{62}N_2O_3$ (1 mol% crystal water): C, 72.29; H, 11.42; N, 4.96); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (6H, t, $2CH_3$), 0.98-1.31 (32H, br, $(CH_2)_{13}CH_3$ and $CH_3(CH_2)_3CH_2COO$), 1.59-1.61 (2H, m, $NHCH_2CH_2$), 2.24 (2H, t, CH_2COO), 2.88-2.94 (2H, m, $COCH(NMe_3)CH_2$), 3.07-3.23 (2H, m, $NHCH_2$), 3.46 (9H, s, NMe_3), 5.84 (1H, t, NHCOC*H*), 7.23-7.32 (5H, m, Ph), 9.29 (1H, s, CONH).

Compound 2d: $[\alpha]^{23}_{D}$ +10.2 (c 5.1 in $CHCl_3$); (Found: C, 59.11; H, 8.49; N, 4.76. Calcd (%) for $C_{30}H_{51}Cl_3N_2O_3$ (1 mol% crystal water): C, 58.87; H, 8.73; N, 4.58); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.83 (3H, t, CH_3), 1.00-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.41-1.63 (2H, m, $NHCH_2CH_2$), 2.88-2.95 (2H, m, $COCH(NMe_3)CH_2$), 3.06-3.23 (2H, m, $NHCH_2$), 3.48 (9H, s, NMe_3), 5.84 (1H, t, NHCOC*H*), 6.90-7.60 (5H, m, Ph), 8.89 (1H, s, CONH).

Compound 2e: $[\alpha]^{23}_D$ +6.6 (c 5.6 in $CHCl_3$); (Found: C, 73.77; H, 10.56; N, 4.93. Calcd (%) for $C_{36}H_{58}N_2O_3$ (1 mol% crystal water): C, 73.93; H, 10.34; N, 4.79); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.99-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.74 (2H, br, $NHCH_2CH_2$), 2.91-3.12 (2H, m, $COCH(NMe_3)CH_2$), 3.20-3.23 (2H, m, $NHCH_2$), 3.41 (9H, s, NMe_3), 3.48 (2H, s, CH_2COO), 5.66 (1H, t, NHCOCH), 7.26-7.33 (10H, m, all aromatic CH), 8.82 (1H, s, CONH).

Compound 2f: $[\alpha]^{23}_D$ +5 (c 5.0 in $CHCl_3$); (Found: C, 75.79; H, 9.51; N, 4.36. Calcd (%) for $C_{40}H_{60}N_2O_3$ (1 mol% crystal water): C, 75.67; H, 9.84; N, 4.41); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.89-1.25 (28H, br, $(CH_2)_{14}CH_3$), 2.7-2.76 (2H, m, $COCH(NMe_3)CH_2$), 2.91-2.99 (2H, m, $NHCH_2$), 3.07 (9H, s, NMe_3), 4.02 (2H, s, CH_2COO), 5.12 (1H, t, NHCOCH), 7.20-8.02 (12H, m, all aromatic CH), 8.47 (1H, s, CONH).

Compound 2g: $[\alpha]^{23}_D$ +11.3 (c 4.6 in $CHCl_3$); (Found: C, 73.43; H, 10.05; N, 5.07. Calcd (%) for $C_{35}H_{56}N_2O_3$ (1 mol% crystal water): C, 73.64; H, 10.24; N, 4.91); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.98-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.77 (2H, br, $NHCH_2CH_2$), 2.89-2.95 (2H, m, $COCH(NMe_3)CH_2$), 3.06-3.31 (2H, m, $NHCH_2$), 3.44 (9H, s, NMe_3), 5.87 (1H, t, NHCOCH), 7.24-7.42 (10H, m, all aromatic CH), 9.01 (1H, s, CONH).

Compound 2h: $[\alpha]^{23}_D$ +9.4 (c 4.2 in $CHCl_3$); (Found: C, 71.48; H, 9.92; N, 4.63.Calcd (%) for $C_{35}H_{56}N_2O_4$ (1 mol% crystal water): C, 71.63; H, 9.96; N, 4.77); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.87 (3H, t, CH_3), 0.96-1.24 (28H, br,$(CH_2)_{14}CH_3$), 2.89-2.91 (2H, m, $COCH(NMe_3)CH_2$), 3.07-3.22 (2H, m, $NHCH_2$), 3.41 (9H, s, NMe_3), 5.55 (1H, t, NHCOCH), 6.8-7.91 (9H, m, all aromatic CH), 8.82 (1H, s, CONH).

All the compounds of the series **3** have same quaternary ammonium cation. So *m/z* values are same for all the compounds in this series and hence the value of **3a** is only given.

Compound 3a: (Found: C, 66.84; H, 12.18; N, 7.31.Calcd (%) for $C_{21}H_{45}ClN_2O$: C, 66.89; H, 12.03; N, 7.43); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.78 (3H, t, CH_3), 0.91-1.35 (28H, br,$(CH_2)_{14}CH_3$) , 3.19-3.21 (2H, m, $NHCH_2$), 3.42 (9H, s, NMe_3), 4.62 (2H, s, $NHCOCH_2$), 8.20 (1H, s, CONH); MS (ESI): *m/z* calcd for $C_{21}H_{45}N_2O$ (the 4° ammonium ion, 100%): 341.3532, found 341.4761 [M^+].

Compound 3b: (Found: C, 66.04; H, 11.87; N, 6.41.Calcd (%) for $C_{23}H_{48}N_2O_3$ (1 mol% crystal water): C, 65.98; H, 12.04; N, 6.69); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.9-1.25 (26H, br,$(CH_2)_{13}CH_3$), 1.48-1.57 (2H, m, $NHCH_2CH_2$), 2.0 (3H, s, CH_3COO), 3.22-3.26 (2H, m, $NHCH_2$), 3.46 (9H, s, NMe_3), 4.63 (2H, s, $NHCOCH_2$), 9.81 (1H, s, CONH).

Compound 3c: (Found: C, 70.04; H, 12.27; N, 5.78.Calcd (%) for $C_{27}H_{56}N_2O_3$ (0.5 mol% crystal water): C, 69.63; H, 12.34; N, 6.01) ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (6H, t, $2CH_3$), 0.96-1.25 (32H, br,$(CH_2)_{13}CH_3$ and $CH3(CH_2)_3CH_2COO$) , 1.42-1.57 (2H, m, $NHCH_2CH_2$), 2.0 (2H, t, CH_2COO) 3.22-3.29 (2H, m, $NHCH_2$), 3.42 (9H, s, NMe_3), 4.62 (2H, s, $NHCOCH_2$) , 9.81 (1H, s, CONH).

Compound 3d: (Found: C, 52.77; H, 8.86; N, 5.54.Calcd (%) for $C_{23}H_{45}Cl_3N_2O_3$ (1 mol% crystal water): C, 52.92; H, 9.08; N, 5.37); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.80 (3H, t, CH_3), 1.1-1.17 (26H, br, $(CH_2)_{13}CH_3$), 1.47 (2H, br, $NHCH_2CH_2$), 3.15 (2H, t, $NHCH_2$), 3.33 (9H, s, NMe_3), 4.62 (2H, t, $NHCOCH_2$), 9.81 (1H, s, CONH).

Compound 3e: (Found: C, 70.11; H, 10.85; N, 5.54.Calcd (%) for $C_{29}H_{52}N_2O_3$ (1 mol% crystal water): C, 70.4; H, 11.00; N, 5.66); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.81 (3H, t, CH_3), 0.9-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.42-1.51 (2H, br, $NHCH_2CH_2$), 3.19 (2H, t, $NHCH_2$), 3.26 (9H, s, NMe_3), 3.61 (2H, s, CH_2COO), 4.38 (2H, s, $NHCOCH_2$), 7.21-7.3 (5H, m, Ph), 9.37 (1H, s, CONH).

Compound 3f: (Found: C, 72.56; H, 10.52; N, 5.12.Calcd (%) for $C_{33}H_{54}N_2O_3$ (1 mol% crystal water): C, 72.75; H, 10.36; N, 5.14); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.89-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.56-1.58 (2H, br, $NHCH_2CH_2$), 2.95 (9H, s, NMe_3), 3.05-3.06 (2H, m, $NHCH_2$), 3.65 (2H, s, CH_2COO), 4.04 (2H, s, $NHCOCH_2$), 7.26-8.06 (7H, m, all aromatic CH), 8.98 (1H, s, CONH).

Compound 3g: (Found: C, 71.22; H, 10.74; N, 5.75. Calcd (%) for $C_{28}H_{50}N_2O_3$ (0.5 mol% crystal water): C, 71.29; H, 10.9; N, 5.94); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 1.21-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.50-1.56 (2H, m, $NHCH_2CH_2$), 3.01-3.25 (2H, m, $NHCH_2$), 3.43 (9H, s, NMe_3), 4.63 (2H, s, $NHCOCH_2$), 7.41-8.1 (5H, m, Ph), 9.46 (1H, s, CONH).

Compound 3h: ^{1}H NMR (Found: C, 69.12; H, 10.63; N, 5.52.Calcd (%) for $C_{28}H_{50}N_2O_4$ (0.5 mol% crystal water): C, 68.95; H, 10.54; N, 5.74); (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.98-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.42-1.56 (2H, m, $NHCH_2CH_2$), 3.08-3.26 (2H, m, $NHCH_2$), 3.47 (9H, s, NMe_3), 4.56 (2H, s, $NHCOCH_2$), 7.85-7.92 (4H, m, all aromatic CH), 9.24 (1H, s, CONH).

All the compounds of the series **4** have same quaternary ammonium cation. So *m/z* values are same for all the compounds in this series and hence the value of **4a** is only given.

Compound 4a: $[\alpha]^{23}_D$ -6.2 (c 4.1 in $CHCl_3$); (Found: C, 67.81; H, 12.31; N, 6.98. Calcd (%) for $C_{22}H_{47}ClN_2O$: C, 67.57; H, 12.11; N, 7.16) ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.9-1.35 (26H, br, $(CH_2)_{13}CH_3$), 1.54-1.61 (3H, d, $CHCH_3$) 1.87 (2H, br, $NHCH_2CH_2$), 3.13-3.29 (2H, m, $NHCH_2$), 3.61 (9H, s, NMe_3), 5.43-5.49 (1H, q, $NHCOCH$), 8.65 (1H, s, CONH); MS (ESI): *m/z* calcd for $C_{22}H_{47}N_2O$ (the 4° ammonium ion, 100%): 355.3688, Found 355.2365 [M^+].

Compound 4b: $[\alpha]^{23}_{D}$ -5.2 (c 5.1 in $CHCl_3$); (Found: C, 68.15; H, 12.27; N, 6.79.Calcd (%) for $C_{24}H_{50}N_2O_3$ (0.5 mol% crystal water): C, 68.04; H, 12.13; N, 6.61); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.83 (3H, t, CH_3), 0.9-1.35 (26H, br, $(CH_2)_{13}CH_3$), 1.55-1.57 (3H, d, $CHCH_3$) 1.77 (2H, br, $NHCH_2CH_2$), 1.99 (3H, s, CH_3COO), 3.19-3.24 (2H, m, $NHCH_2$), 3.29 (9H, s, NMe_3), 5.53-5.6 (1H, q, NHCOC*H*), 10.22 (1H, s, CONH).

Compound 4c: $[\alpha]^{23}_{D}$ -4.2 (c 5.7 in $CHCl_3$); (Found: C, 69.01.32; H, 12.33; N, 6.02. Calcd (%) for $C_{28}H_{58}N_2O_3$ (1 mol% crystal water): C, 68.8; H, 12.37; N, 5.73); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (6H, t, $2CH_3$), 1.1-1.24 (34H, br, $(CH_2)_{14}CH_3$ and $CH_3(CH_2)_3CH_2COO$), 1.56-1.58 (3H, d, $CHCH_3$), 2.22 (2H, t, CH_2COO), 3.19-3.26 (2H, m, $NHCH_2$), 3.30 (9H, s, NMe_3), 5.48-5.53(1H, q, NHCOC*H*), 10.20 (1H, s, CONH).

Compound 4d: $[\alpha]^{23}_{D}$ -11.1 (c 5.4 in $CHCl_3$); (Found: C, 54.03; H, 9.28; N, 5.45. Calcd (%) for $C_{24}H_{47}Cl_3N_2O_3$ (1 mol% crystal water): C, 53.78; H, 9.21; N, 5.23); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.99-1.25 (28H, br, $(CH_2)_{14}CH_3$), 1.45-1.58 (3H, br, $CHCH_3$), 3.16-3.32 (2H, m, $NHCH_2$), 3.39 (9H, s, NMe_3), 5.2 (1H, br, NHCOC*H*), 10.14 (1H, s, CONH).

Compound 4e: $[\alpha]^{23}_{D}$ -8.9 (c 5.0 in $CHCl_3$); (Found: C, 70.66; H, 11.26; N, 5.41.Calcd (%) for $C_{30}H_{54}N_2O_3$ (1 mol% crystal water): C, 70.82; H, 11.09; N, 5.51) ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.99-1.35 (28H, br, $(CH_2)_{14}CH_3$), 1.42-1.44 (3H, br, $CHCH_3$), 2.85-3.09 (2H, m, $NHCH_2$), 3.33 (9H, s, NMe_3), 3.59 (2H, s, CH_2COO) 5.07 (1H, br, NHCOC*H*), 7.06-7.32 (5H, m, Ph), 9.59 (1H, s, CONH).

Compound 4f: $[\alpha]^{23}_{D}$ -7.2 (c 5.2 in $CHCl_3$); (Found: C, 73.12; H, 10.69; N, 5.16.Calcd (%) for $C_{34}H_{56}N_2O_3$ (1 mol% crystal water): C, 73.07; H, 10.46; N, 5.01) ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.88 (3H, t, CH_3), 0.9-1.25 (28H, br, $(CH_2)_{14}CH_3$), 1.35-1.42 (3H, br, $CHCH_3$), 2.85-

3.33 (2H, m, NHC*H*$_2$), 3.49 (9H, s, NMe_3), 3.59 (2H, s, CH_2COO), 5.05 (1H, br, NHCOC*H*), 7.2-7.32 (7H, m, all aromatic CH), 9.61 (1H, s, CONH).

Compound 4g: $[\alpha]^{23}_D$ -7.6 (c 4.2 in $CHCl_3$); (Found: C, 71.80; H, 10.92; N, 5.72.Calcd (%) for $C_{29}H_{52}N_2O_3$ (0.5 mol% crystal water): C, 71.71; H, 11.0; N, 5.77); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 1.01-1.35 (28H, br, (C*H*$_2$)$_{14}CH_3$), 1.42-1.56 (3H, br, CHC*H*$_3$), 3.25-3.4 (2H, m, NHC*H*$_2$), 3.48 (9H, s, NMe_3), 5.44 (1H, br, NHCOC*H*), 7.39-8.09 (5H, m, Ph), 10.08 (1H, s, CONH).

Compound 4h: $[\alpha]^{23}_D$ –10 (c 4.8 in $CHCl_3$); (Found: C, 67.95; H, 10.52; N, 5.36.Calcd (%) for $C_{29}H_{52}N_2O_4$ (1 mol% crystal water): C, 68.2; H, 10.66; N, 5.48); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.87 (3H, t, CH_3), 1.0-1.36 (28H, br, (C*H*$_2$)$_{14}CH_3$), 1.4-1.52 (3H, br, CHC*H*$_3$), 2.73-3.23 (2H, m, NHC*H*$_2$), 3.27 (9H, s, NMe_3), 5.17 (1H, br, NHCOC*H*), 6.81-7.91 (4H, m, all aromatic CH), 9.44 (1H, s, CONH).

All the compounds of the series **5** have same quaternary ammonium cation. So *m/z* values are same for all the compounds in this series and hence the value of **5a** is only given.

Compound 5a: $[\alpha]^{23}_D$ –7.8 (c 4.5 in $CHCl_3$); (Found: C, 68.92; H, 12.38; N, 7.01.Calcd (%) for $C_{24}H_{51}ClN_2O$: C, 68.78; H, 12.26; N, 6.68); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.81 (3H, t, CH_3), 0.93-0.97 (6H, d, (C*H*$_3$)$_2$CH), 1.06-1.27 (26H, br, (C*H*$_2$)$_{13}CH_3$), 1.48-1.53 (2H, m, $NHCH_2CH_2$), 2.28-2.36 (1H, m, $(CH_3)_2CH$), 3.13-3.24 (2H, m, NHC*H*$_2$), 3.35 (9H, s, NMe_3), 5.38 (1H, br, NHCOC*H*), 8.28 (1H, s, CONH); MS (ESI): *m/z* calcd for $C_{24}H_{51}N_2O$ (the 4° ammonium ion, 100%): 383.4001, Found 383.3309 [M^+].

Compound 5b: $[\alpha]^{23}_D$ -9.5 (c 6.2 in $CHCl_3$); (Found: C, 68.02; H, 11.96; N, 6.12.Calcd (%) for $C_{26}H_{54}N_2O_3$ (1 mol% crystal water): C, 67.78; H, 12.25; N, 6.08); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.87-0.9 (6H, d, (C*H*$_3$)$_2$CH), 0.99-1.28 (26H, br, (C*H*$_2$)$_{13}CH_3$),

1.43-1.55 (2H, m, $NHCH_2CH_2$), 2.25 (3H, s, CH_3COO), 2.36 (1H, br, $(CH_3)_2CH$), 3.16-3.29 (2H, m, $NHCH_2$), 3.39 (9H, s, NMe_3), 5.18 (1H, br, NHCOCH), 8.36 (1H, s, CONH).

Compound 5c: $[\alpha]^{23}_D$ -13.2 (c 5.1 in $CHCl_3$); (Found: C, 70.03; H, 12.35; N, 5.49.Calcd (%) for $C_{30}H_{62}N_2O_3$ (1 mol% crystal water): C, 69.72; H, 12.48; N, 5.42); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (6H, t, $2CH_3$), 0.87-0.9 (6H, d, $(CH_3)_2CH$), 0.99-1.31 (32H, br, $(CH_2)_{13}CH_3$ and $CH_3(CH_2)_3CH_2COO$), 1.55-1.57 (2H, m, $NHCH_2CH_2$), 2.25-2.35 (3H, m, $(CH_3)_2CH$ and CH_2COO), 3.16-3.29 (2H, m, $NHCH_2$), 3.34 (9H, s, NMe_3), 5.21 (1H, br, NHCOCH), 8.56 (1H, s, CONH).

Compound 5d: $[\alpha]^{23}_D$ -12.2 (c 6.3 in $CHCl_3$); (Found: C, 56.21; H, 9.56; N, 4.96.Calcd (%) for $C_{26}H_{51}Cl_3N_2O_3$ (0.5 mol% crystal water): C, 56.26; H, 9.46; N, 5.05); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.85-0.9 (6H, d, $(CH_3)_2CH$), 0.99-1.3 (26H, br, $(CH_2)_{13}CH_3$), 1.54-1.56 (2H, m, $NHCH_2CH_2$), 2.25-2.35 (1H, m, $(CH_3)_2CH$), 3.15-3.31 (2H, m, $NHCH_2$), 3.39 (9H, s, NMe_3), 5.18 (1H, br, NHCOCH), 8.34 (1H, s, CONH).

Compound 5e: $[\alpha]^{23}_D$ -10.3 (c 3.9 in $CHCl_3$); (Found: C, 72.78; H, 11.15; N, 5.25. Calcd (%) for $C_{32}H_{58}N_2O_3$ (0.5 mol% crystal water): C, 72.82; H, 11.27; N, 5.31); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.87-0.9 (6H, d, $(CH_3)_2CH$), 1.12-1.31 (26H, br, $(CH_2)_{13}CH_3$), 1.53-1.58 (2H, m, $NHCH_2CH_2$), 2.33-2.4 (1H, m, $(CH_3)_2CH$), 3.16-3.29 (2H, m, $NHCH_2$), 3.38 (9H, s, NMe_3), 3.6 (2H, s, CH_2COO), 5.24 (1H, br, NHCOCH), 7.26-7.3 (5H, m, Ph), 9.2 (1H, s, CONH).

Compound 5f: $[\alpha]^{23}_D$ -8.5 (c 3.9 in $CHCl_3$); (Found: C, 73.81; H, 10.53; N, 5.01. Calcd (%) for $C_{36}H_{60}N_2O_3$ (1 mol% crystal water): C, 73.67; H, 10.65; N, 4.77); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.83 (3H, t, CH_3), 0.87-0.9 (6H, d, $(CH_3)_2CH$), 1.0-1.3 (26H, br, $(CH_2)_{13}CH_3$), 1.54-1.58 (2H, m, $NHCH_2CH_2$), 2.35-2.38 (1H, m, $(CH_3)_2CH$), 3.18-3.29 (2H, m, $NHCH_2$), 3.46 (9H,

s, NMe_3), 3.48 (2H, s, CH_2COO), 5.28 (1H, br, NHCOC*H*), 7.26-7.31(7H, m, all aromatic CH), 9.22 (1H, s, CONH).

Compound 5g: $[\alpha]^{23}_D$ -11.2 (c 5.2 in $CHCl_3$); (Found: C, 72.35; H, 11.25; N, 5.31.Calcd (%) for $C_{31}H_{56}N_2O_3$ (0.5 mol% crystal water): C, 72.47; H, 11.18; N, 5.45); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.87-0.89 (6H, d, $(CH_3)_2CH$), 1.02-1.28 (26H, br, $(CH_2)_{13}CH_3$), 1.56-1.58 (2H, m, $NHCH_2CH_2$), 2.2-2.41 (1H, m, $(CH_3)_2CH$), 3.2-3.31 (2H, m, $NHCH_2$), 3.48 (9H, s, NMe_3), 5.26 (1H, br, NHCOC*H*), 7.35-8.07 (5H, m, Ph), 10.07 (1H, s, CONH).

Compound 5h: $[\alpha]^{23}_D$ -13.2 (c 4.3 in $CHCl_3$); (Found: C, 70.13; H, 11.06; N, 5.15. Calcd (%) for $C_{31}H_{56}N_2O_4$ (0.5 mol% crystal water): C, 70.28; H, 10.84; N, 5.29); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.87-0.89 (6H, d, $(CH_3)_2CH$), 0.97-1.24 (26H, br, $(CH_2)_{13}CH_3$), 1.55-1.57 (2H, m, $NHCH_2CH_2$), 2.34 (1H, m, $(CH_3)_2CH$), 2.96-3.24 (2H, m, $NHCH_2$), 3.36 (9H, s, NMe_3), 5.02 (1H, br, NHCOC*H*), 6.83-7.92 (4H, m, all aromatic CH), 9.26 (1H, s, CONH).

All the compounds of the series **6** have same quaternary ammonium cation. So *m/z* values are same for all the compounds in this series and hence the value of **6a** is only given.

Compound 6a: $[\alpha]^{23}_D$ –6.2 (c 4.8 in $CHCl_3$); (Found: C, 69.24; H, 12.2; N, 6.38.Calcd (%) for $C_{25}H_{53}ClN_2O$: C, 69.32; H, 12.33; N, 6.47); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.84-0.9 (6H, m, $(CH_3)_2CH$), 1.0-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.41-1.44 (1H, m, $CH_3)_2CH$), 1.55-1.58 (2H, m, $NHCH_2CH_2$), 2.08-2.12 (2H, m, $(CH_3)_2CHCH_2$), 3.22-3.26 (2H, m, $NHCH_2$), 3.4 (9H, s, NMe_3), 5.3 (1H, br, NHCOC*H*), 8.78 (1H, s, CONH); MS (ESI): *m/z* calcd for $C_{25}H_{53}N_2O$ (the 4° ammonium ion, 100%): 397.4158, Found 397.3561 [M^+].

Compound 6b: $[\alpha]^{23}_D$ -12.1 (c 4.6 in $CHCl_3$); (Found: C, 70.01; H, 12.14; N, 5.83.Calcd (%) for $C_{27}H_{56}N_2O_3$ (0.5 mol% crystal water): C, 69.63; H, 12.34; N, 6.01); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.85-0.9 (6H, m, $(CH_3)_2CH$), 0.98-1.25 (26H, br, $(CH_2)_{13}CH_3$),

1.56-1.59 (1H, m, $CH_3)_2CH$), 1.61-1.68 (2H, m, $NHCH_2CH_2$), 1.99 (3H, s, CH_3COO), 2.1-2.11 (2H, m, $(CH_3)_2CHCH_2$), 3.19-3.23 (2H, m, $NHCH_2$), 3.31 (9H, s, NMe_3), 5.44 (1H, br, NHCOC*H*), 10.26 (1H, s, CONH).

Compound 6c: $[\alpha]^{23}_D$ -10.3 (c 4.3 in $CHCl_3$); (Found: C, 70.02; H, 12.75; N, 5.37.Calcd (%) for $C_{31}H_{64}N_2O_3$ (1 mol% crystal water): C, 70.14; H, 12.53; N, 5.28); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (6H, t, $2CH_2CH_3$), 0.99-1.12 (6H, m, $(CH_3)_2CH$), 1.25-1.30 (33H, br, $(CH_2)_{13}CH_3$, $CH_3(CH_2)_3CH_2COO$ and $CH_3)_2CH$), 1.32-1.56 (4H, m, $NHCH_2CH_2$ and $(CH_3)_2CHCH_2$), 2.25 (2H, br, CH_2COO), 3.17-3.28 (2H, m, $NHCH_2$), 3.38 (9H, s, NMe_3), 5.32 (1H, br, NHCOC*H*), 8.59 (1H, s, CONH).

Compound 6d: $[\alpha]^{23}_D$ -13.4 (c 4.7 in $CHCl_3$); (Found: C, 56.63; H, 9.32; N, 5.05.Calcd (%) for $C_{27}H_{53}Cl_3N_2O_3$ (1 mol% crystal water): C, 56.10; H, 9.59; N, 4.85) ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.9-1.13 (6H, m, $(CH_3)_2CH$), 1.15-1.25 (26H, br, $(CH_2)_{13}CH_3$), 1.38-1.42 (1H, m, $CH_3)_2CH$), 1.45-1.55 (2H, m, $NHCH_2CH_2$), 1.8-2.11 (2H, m, $(CH_3)_2CHCH_2$), 3.23-3.32 (2H, m, $NHCH_2$), 3.48 (9H, s, NMe_3), 5.26 (1H, br, NHCOC*H*), 8.76 (1H, s, CONH).

Compound 6e: $[\alpha]^{23}_D$ -9.3 (c 4.1 in $CHCl_3$); (Found: C, 72.08; H, 11.46; N, 5.32. Calcd (%) for $C_{33}H_{60}N_2O_3$ (1 mol% crystal water): C, 71.95; H, 11.34; N, 5.09); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.83 (3H, t, CH_3), 0.87-0.96 (6H, m, $(CH_3)_2CH$), 0.99-1.24 (27H, br, $(CH_2)_{13}CH_3$ and $CH_3)_2CH$), 1.43 (2H, br, $NHCH_2CH_2$), 1.99-2.03 (2H, m, $(CH_3)_2CHCH_2$), 3.18-3.25 (2H, m, $NHCH_2$), 3.46 (9H, s, NMe_3), 3.6 (2H, s, CH_2COO), 5.15 (1H, br, NHCOC*H*), 7.22-7.29 (5H, m, Ph), 9.81 (1H, s, CONH).

Compound 6f: $[\alpha]^{23}_D$ –8.5 (c 4.1 in $CHCl_3$); (Found: C, 73.71; H, 10.21; N, 5.03.Calcd (%) for $C_{37}H_{62}N_2O_3$ (1 mol% crystal water): C, 73.95; H, 10.73; N, 4.66); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.87-0.93 (6H, m, $(CH_3)_2CH$), 1.17-1.35 (27H, br, $(CH_2)_{13}CH_3$ and

$CH_3)_2CH$), 1.43 (2H, br, $NHCH_2CH_2$), 1.9-1.95 (2H, m, $(CH_3)_2CHCH_2$), 3.09-3.28 (2H, m, $NHCH_2$), 3.39 (9H, s, NMe_3), 3.52 (2H, s, CH_2COO), 4.95 (1H, br, NHCOCH), 7.13-7.22 (7H, m, all aromatic CH), 9.62 (1H, s, CONH).

Compound 6g: $[\alpha]^{23}_D$ –11.3 (c 6.1 in $CHCl_3$); (Found: C, 71.32; H, 11.02; N, 5.07. Calcd (%) for $C_{32}H_{58}N_2O_3$ (1 mol% crystal water): C, 71.59; H, 11.27; N, 5.22); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.84 (3H, t, CH_3), 0.88-0.98 (6H, m, $(CH_3)_2CH$), 1.01-1.23 (26H, br, $(CH_2)_{13}CH_3$), 1.38-1.42 (1H, m, $CH_3)_2CH$), 1.46-1.6 (2H, m, $NHCH_2CH_2$), 2.1-2.11 (2H, m, $(CH_3)_2CHCH_2$), 3.2-3.31 (2H, m, $NHCH_2$), 3.4 (9H, s, NMe_3), 5.19 (1H, br, NHCOCH), 7.43-8.1 (5H, m, Ph), 8.73 (1H, s, CONH).

Compound 6h: $[\alpha]^{23}_D$ -14.1 (c 4.9 in $CHCl_3$); (Found: C, 71.04; H, 11.12; N, 5.27.Calcd (%) for $C_{32}H_{58}N_2O_4$ (0.5 mol% crystal water): C, 70.67; H, 10.94; N, 5.15); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.84 (3H, t, CH_3), 0.89-0.93 (6H, m, $(CH_3)_2CH$), 0.99-1.24 (26H, br, $(CH_2)_{13}CH_3$), 1.38-1.43 (1H, m, $CH_3)_2CH$), 1.45-1.59 (2H, m, $NHCH_2CH_2$), 2.07-2.11 (2H, m, $(CH_3)_2CHCH_2$), 3.22-3.35 (2H, m, $NHCH_2$), 3.4 (9H, s, NMe_3), 5.19 (1H, br, NHCOCH), 7.43-8.1 (4H, m, all aromatic CH), 8.74 (1H, s, CONH).

All the compounds of the series **7** have same quaternary ammonium cation. So *m/z* values are same for all the compounds in this series and hence the value of **7a** is only given.

Compound 7a: $[\alpha]^{23}_D$ -8.3 (c 5.4 in $CHCl_3$); (Found: C, 69.13; H, 12.02; N, 6.12. Calcd (%) for $C_{25}H_{53}ClN_2O$: C, 69.32; H, 12.33; N, 6.47); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.84 (3H, t, CH_3), 0.87-1.02 (6H, m, $CH(CH_3)CH_2CH_3$), 1.13-1.3 (28H, br, $(CH_2)_{13}CH_3$ and $CH(CH_3)CH_2CH_3$), 1.41-1.44 (2H, m, $NHCH_2CH_2$), 2.08-2.11 (1H, m, $CH(CH_3)CH_2CH_3$), 3.22-3.3 (2H, m, $NHCH_2$), 3.4 (9H, s, NMe_3), 5.3 (1H, br, NHCOCH), 8.78 (1H, s, CONH); MS (ESI): *m/z* calcd for $C_{25}H_{53}N_2O$ (the 4° ammonium ion, 100%): 397.4158, Found 397.3561 [M^+].

Compound 7b: $[\alpha]^{23}_{D}$ -6.5 (c 5.4 in $CHCl_3$); (Found: C, 69.88; H, 11.97; N, 5.82.Calcd (%) for $C_{27}H_{56}N_2O_3$ (0.5 mol% crystal water): C, 69.63; H, 12.34; N, 6.01); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.84 (3H, t, CH_3), 0.89-1.01 (6H, m, CH(C*H*$_3$)CH_2C*H*$_3$), 1.12-1.37 (28H, br, (C*H*$_2$)$_{13}CH_3$ and CH(CH_3)C*H*$_2CH_3$), 1.43-1.56 (2H, m, NHCH_2C*H*$_2$), 1.8 (3H, s, CH_3COO), 2.1-2.11 (1H, m, C*H*(CH_3)CH_2C*H*$_3$), 3.22-3.31 (2H, m, NHC*H*$_2$), 3.35 (9H, s, NMe_3), 5.2 (1H, br, NHCOC*H*), 8.75 (1H, s, CONH).

Compound 7c: $[\alpha]^{23}_{D}$ -7.8 (c 5.0 in $CHCl_3$); (Found: C, 71.13; H, 12.89; N, 5.11. Calcd (%) for $C_{31}H_{64}N_2O_3$ (0.5 mol% crystal water): C, 71.35; H, 12.55; N, 5.37); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.77 (6H, t, 2CH_3), 0.81-1.04 (6H, m, CH(C*H*$_3$)CH_2C*H*$_3$), 1.07-1.24 (34H, br, (C*H*$_2$)$_{13}CH_3$ CH_3(C*H*$_2$)$_3CH_2$COO and CH(CH_3)C*H*$_2CH_3$), 1.48-1.59 (3H, m, NHCH_2C*H*$_2$ and C*H*(CH_3)CH_2CH_3), 2.17-2.28 (2H, m, CH_2COO), 3.11-3.24 (2H, m, NHC*H*$_2$), 3.38 (9H, s, NMe_3), 5.26 (1H, br, NHCOC*H*), 9.27 (1H, s, CONH).

Compound 7d: $[\alpha]^{23}_{D}$ -9 (c 4.7 in $CHCl_3$); (Found: C, 56.6; H, 9.42; N, 4.71.Calcd (%) for $C_{27}H_{53}Cl_3N_2O_3$ (0.5 mol% crystal water): C, 56.98; H, 9.56; N, 4.92); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.84 (3H, t, CH_3), 0.87-1.02 (6H, m, CH(C*H*$_3$)CH_2C*H*$_3$), 1.13-1.41 (28H, br, (C*H*$_2$)$_{13}CH_3$ and CH(CH_3)C*H*$_2CH_3$), 1.44-1.58 (2H, m, NHCH_2C*H*$_2$), 2.08-2.12 (1H, m, C*H*(CH_3)CH_2CH_3), 3.22-3.30 (2H, m, NHC*H*$_2$), 3.35 (9H, s, NMe_3), 5.3 (1H, br, NHCOC*H*), 8.79 (1H, s, CONH);

Compound 7e: $[\alpha]^{23}_{D}$ –14.3 (c 4.5 in $CHCl_3$); (Found: C, 71.73; H, 11.04; N, 5.06. Calcd (%) for $C_{33}H_{60}N_2O_3$ (1 mol% crystal water): C, 71.95; H, 11.34; N, 5.09); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.85 (3H, t, CH_3), 0.9-1.01 (6H, m, CH(C*H*$_3$)CH_2C*H*$_3$), 1.07-1.35 (28H, br, (C*H*$_2$)$_{13}CH_3$ and CH(CH_3)C*H*$_2CH_3$), 1.43-1.51 (2H, m, NHCH_2C*H*$_2$), 1.99-2.03 (1H, m,

C*H*(CH_3)CH_2CH_3), 3.17-3.27 (2H, m, NHC*H*$_2$), 3.37 (9H, s, NMe_3), 3.55 (2H, s, CH_2COO), 5.04 (1H, br, NHCOC*H*), 6.9-7.93 (5H, m, Ph), 9.7 (1H, s, CONH).

Compound 7f: $[\alpha]^{23}_D$ -11 (c 4.2 in $CHCl_3$); (Found: C, 74.86; H, 10.64; N, 4.57.Calcd (%) for $C_{37}H_{62}N_2O_3$ (0.5 mol% crystal water): C, 75.08; H, 10.73; N, 4.73); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.82 (3H, t, CH_3), 0.88-0.99 (6H, m, CH(C*H*$_3$)CH_2C*H*$_3$), 1.01-1.35 (28H, br, (C*H*$_2$)$_{13}CH_3$ and CH(CH_3)C*H*$_2CH_3$), 1.43-1.51 (2H, m, NHCH_2C*H*$_2$), 1.96-2.05 (1H, m, C*H*(CH_3)CH_2CH_3), 3.21-3.27 (2H, m, NHC*H*$_2$), 3.47 (9H, s, NMe_3), 3.6 (2H, s, CH_2COO), 5.0 (1H, br, NHCOC*H*), 7.21-7.29 (7H, m, all aromatic CH), 9.73 (1H, s, CONH).

Compound 7g: $[\alpha]^{23}_D$ –12.2 (c 6.2 in $CHCl_3$); (Found: C, 72.64; H, 11.58; N, 5.12. Calcd (%) for $C_{32}H_{58}N_2O_3$ (0.5 mol% crystal water): C, 72.82; H, 11.27; N, 5.31); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.84 (3H, t, CH_3), 0.88-1.11 (6H, m, CH(C*H*$_3$)CH_2C*H*$_3$), 1.13-1.43 (28H, br, (C*H*$_2$)$_{13}CH_3$ and CH(CH_3)C*H*$_2CH_3$), 1.47-1.61 (2H, m, NHCH_2C*H*$_2$), 2.1-2.11 (1H, m, C*H*(CH_3)CH_2CH_3), 3.22-3.32 (2H, m, NHC*H*$_2$), 3.36 (9H, s, NMe_3), 5.2 (1H, br, NHCOC*H*), 7.44-8.11 (5H, m, Ph), 8.72 (1H, s, CONH).

Compound 7h: $[\alpha]^{23}_D$ -9.3 (c 7.1 in $CHCl_3$); (Found: C, 69.38; H, 10.84; N, 5.05.Calcd (%) for $C_{32}H_{58}N_2O_4$ (1 mol% crystal water): C, 69.52; H, 10.94; N, 5.07); ^{1}H NMR (300 MHz, $CDCl_3$, Me_4Si) δ = 0.81 (3H, t, CH_3), 0.87-1.14 (6H, m, CH(C*H*$_3$)CH_2C*H*$_3$), 1.18-1.42 (28H, br, (C*H*$_2$)$_{13}CH_3$ and CH(CH_3)C*H*$_2CH_3$), 1.43-1.57 (2H, m, NHCH_2C*H*$_2$), 2.08-2.15 (1H, m, C*H*(CH_3)CH_2CH_3), 3.21-3.3 (2H, m, NHC*H*$_2$), 3.35 (9H, s, NMe_3), 5.27 (1H, br, NHCOC*H*), 7.44-8.09 (4H, m, all aromatic CH), 8.76 (1H, s, CONH).

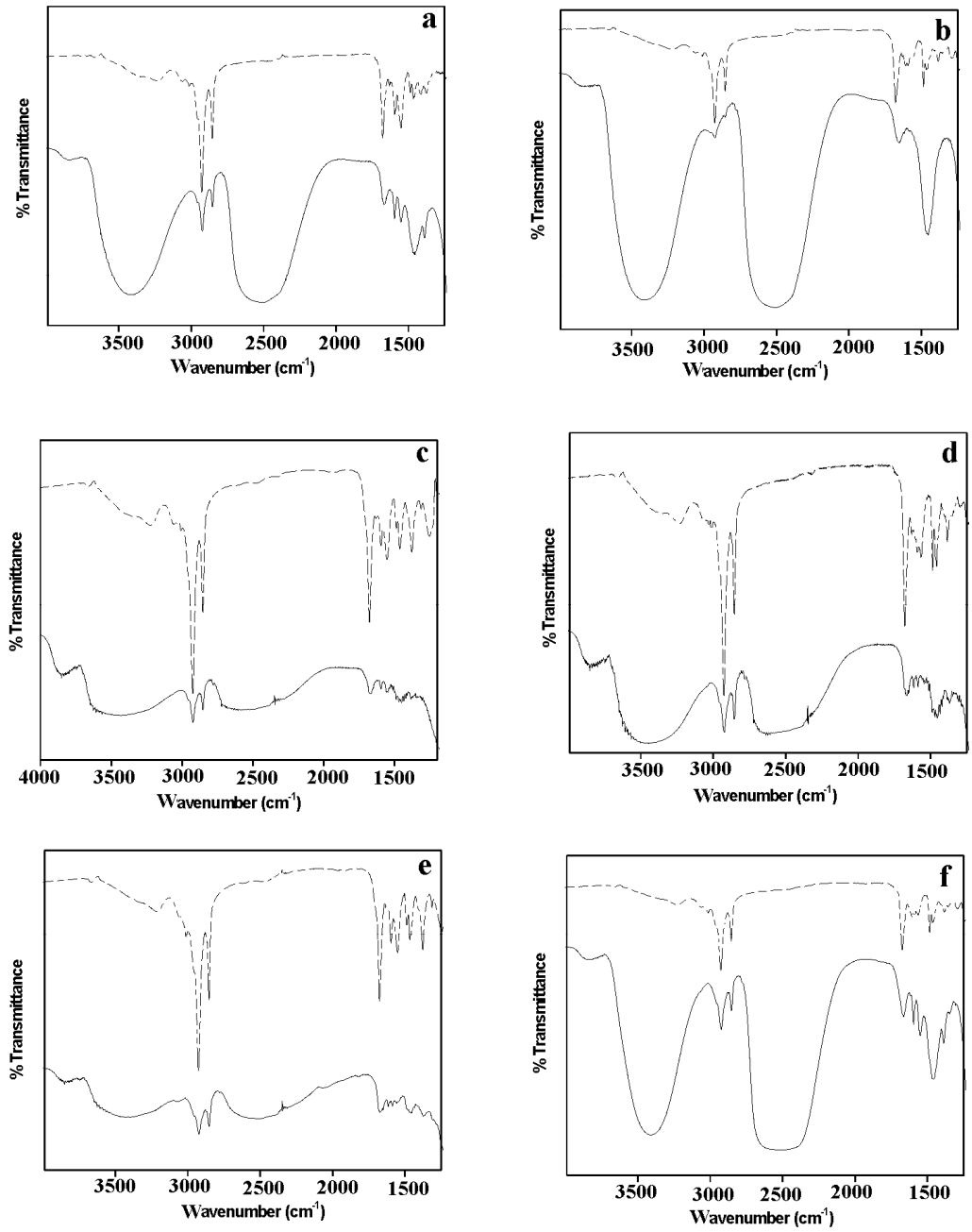

Fig. S1 (a-f) FT-IR spectra of **3g**, **3h**, **4g**, **4h**, **5g**, **5h** in its $CHCl_3$ solution state (dotted line) and D_2O gel state (solid line).

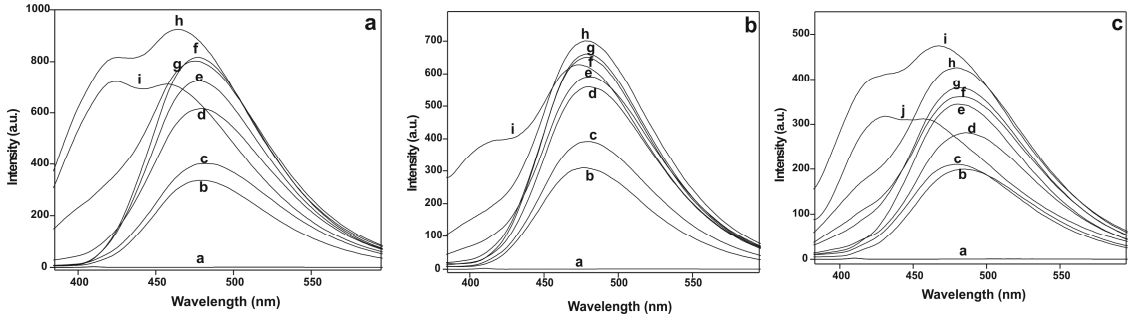

Fig. S2 (a-c) Luminescence spectra of ANS($1x10^{-5}$ M) with varying concentration of gelators in water at room temperature (a) [**1g**] a: 0;b: 0.001;c: 0.0025;d: 0.005;e: 0.01;f: 0.025;g: 0.05;h: 0.1;i: 0.25. [**2h**] a: 0;b: 0.001;c: 0.0025;d: 0.005;e: 0.01;f: 0.025;g: 0.05;h: 0.1;i: 0.25. [**5h**] a: 0;b: 0.001;c: 0.0025;d: 0.005;e: 0.01;f: 0.025;g: 0.05;h: 0.1;i: 0.25.

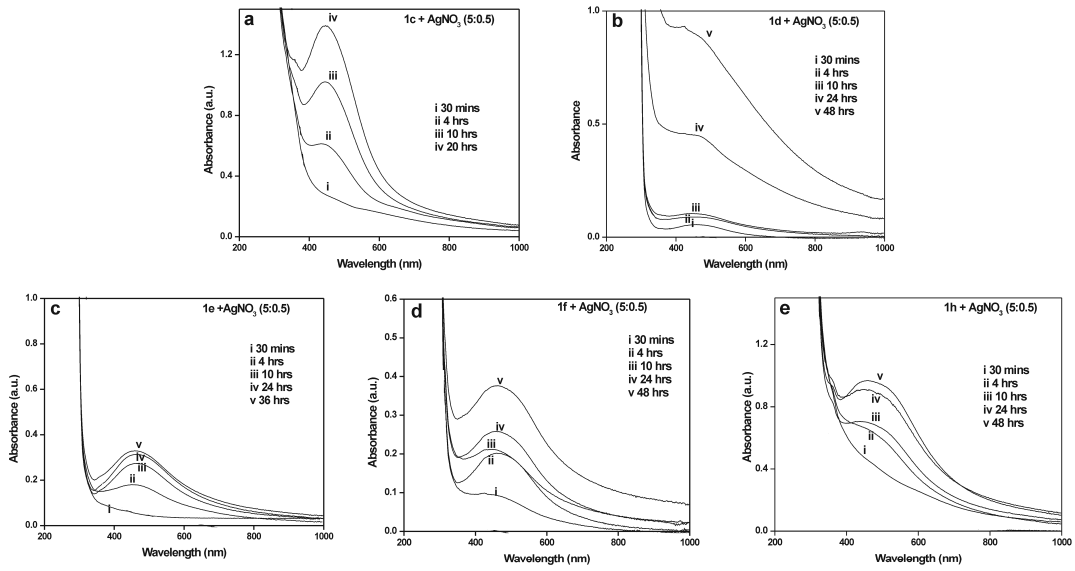

Fig. S3 (a-e) Time dependent UV-Visible study of generation of Ag nanoparticles by the reaction of **1c, 1d, 1e, 1f** and **1h** with $AgNO_3$ (5:0.5).