Supporting information

Influence of pH on the aggregate morphology of a novel surfactant with single hydrocarbon chain and multi-amine head groups

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Synthesis procedures of bis(amidoethylcarbamoylethyl)- octadecyl amine (C18N3):

The synthesis procedure is referenced by Frechet, J. M. J. and Tomalia, D. A. *Laboratory synthesis of poly(amidoamine) (PAMAM) dendrimers* (John Wiley & Sons Ltd: London, 2001; Vol. 25). The synthesis procedures was showed in Scheme 1. A solution of freshly recrystal octadecylamine (8g, 0.03mol) in methanol (20 ml) at room temperature was added dropwise to a stirred solution of methylacrylate (6ml, 0.12mol) in methanol (20 ml), under nitrogen, over a period of 2 h. The final mixture was stirred for a further 24 h. The solvent was removed under reduced pressure at 40°C using a rotary evaporator and the resulting colourless oil. The residue was dissolve in chloroform and washed with 0.1M NaOH solution twice. The chloroform solution collected and dried with anhydrous calcium chloride. Then the crude product separated

by column chromatogram to get colorless oil product, which was measured by NMR and MS. The result was consulted with the reference to be accordant. ^{1}H-NMR (300MHz, $CDCl_3$): δ 0.78(t, 3H), 1.16(s, 32H), 2.38(m, 6H), 2.71(t, 4H), 3.57(m, 6H), ESI-MS (m/z): 442.6 $[M+H]^+$.

Then the solution of above product (11.05g, 0.025mol) in methanol (20 ml) was carefully added to a vigorously stirred solution of 1, 2-diaminoethane (75g, 85ml, 1.2mol) in methanol (100 ml) at room temperature. After complete addition the mixture was stirred for another 24 h at room temperature at which time no ester groups was detectable by NMR spectroscopy. The solvent was removed under reduced pressure maintaining the temperature no higher than 40°C. The excess 1, 2-diaminoethane was removed using an azeotropic mixture of toluene and methanol (9: 1). The remaining toluene removed by azeotropic distillation using methanol. Finally, white powder (10.5g, 0.021mol) was obtain, which separated by TLC with chloroform: methanol: ammonia=1:1:0.1. The final product was then repeated recrystallization with chloroform and cyclohexane and given a white solid, which was measured by NMR and MS. The result was consulted with the reference to be accordant. ^{1}H-NMR (300MHz, $CDCl_3$): δ 0.88(t, 3H), 1.25(s, 32H), 1.84 (s, 4H), 2.38(m, 6H), 2.73(m, 4H), 2.82(m, 4H), 3.29(m, 4H), 7.47(s, 2H), ESI-MS (m/z): 498.6$[M+H]^+$.

Scheme 1.