Supplementary material (ESI) for Chemical Communications

Electronic Supplementary Information

A novel cationic conjugated polymer for homogeneous fluorescence-based DNA detection

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Synthesis Procedure

2,5-Bis(3-[*N,N*-diethylamino]-1-oxapropyl)-1,4-diiodobenzene (DINEt$_2$)

2,5-Diiodohydroquinone (6.45 g), 2-chlorotriethylamine hydrochloride (6.75 g), K_2CO_3 (10.33 g), were added to 150 mL of acetone (dried over Na_2SO_4) and the mixture was refluxed under nitrogen atmosphere for 3 days. After reaction the yellow slurry was poured into 300 mL of H_2O and a solid precipitate collected. The precipitate was dissolved in Et_2O, and the filtrate was extracted with Et_2O (3× 20 mL). The Et_2O solutions were combined and washed with 1 M NaOH (3× 10 mL), H_2O (1× 20 mL), and brine (1× 20 mL). The Et_2O layer was dried over Na_2SO_4, then the solvent was removed under vacuum, giving a very light yellow solid. The solid was recrystallized twice from MeOH/H_2O (7.1 g, 71% yield). ^{1}H NMR ($CDCl_3$) 7.21 (s, 2 H), 4.00 (t, 4 H), 2.91 (t, 4 H), 2.66 (q, 8 H), 1.07 (t,12 H) ppm.

Poly({2,5-bis[3-(*N,N*-diethylamino)-1-oxapropyl]-*p*-phenylenevinylene}-*alt*-*p*-phenylenevinylene) (PPVNET$_2$)

To a stirred mixture of DINEt$_2$ (1.01 g, 1.80 mmol), *p*-divinylbenzene (0.107 g, 0.84 mmol), palladium acetate (7.21 mg, 0.032 mmol), and tri-*o*-tolylphosphine (48.7 mg, 0.16 mmol) in 30mL of anhydrous DMF was added tri-*n*-butylamine(0.50 mL, 2.09 mmol) were added. The reaction mixture was refluxed at 90°C with stirring for 6 h under a nitrogen atmosphere and then poured into methanol. The precipitate was collected, redissolved in chloroform, and filtered to remove the catalyst residue. The filtrate was concentrated and precipitated into methanol, followed again by filtration and reprecipitation. The crude polymer was further purified by extraction in a Soxhlet extractor with methanol for 24 h and then dried under a vacuum at 25 °C for 24 h. PPVNET$_2$ was obtained as 0.40 g of an orange solid. ^{1}H NMR ($CDCl_3$, ppm): 1.16 (broad, 12H,), 2.73 (broad, 4H,), 3.00 (broad, 4H), 4.17 (broad, 4H,), 7.18 (broad, 5H,), 7.53 (broad, 5H). (see Fig. S1)

Poly({2,5-bis[3-(*N,N*-diethylamino)-1-oxapropyl]-*p*-phenylenevinylene}-*alt*-*p*-phenylenevinylene) dibromide (PPVNE$_2$Br$_2$)

0.2 g of PPVNET$_2$ was stirred at room temperature with an excess of bromoethane (20 mL) in 5 mL of THF under a nitrogen atmosphere for 5 days. The partially quaternized amine polymers began to precipitate between 3 and 5 days at room temperature. After reaction, THF and bromomethane were removed under reduced pressure to give PPVNE$_2$Br$_2$**.**

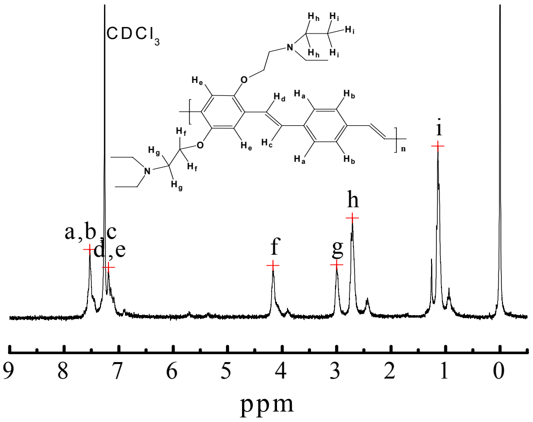

Fig. S1
^{1}H NMR spectroscopy of poly({2,5-bis[3-(*N,N*-diethylamino)-1-oxapropyl]-*p*-phenylenevinylene}-*alt*-*p*- phenylenevinylene). Peaks *f*, *g*, *h* and *i* are attributed to side chain protons. Peaks of vinylene protons overlap with those of aromatic protons in the region of 7 – 7.4 ppm.