Highly Efficient Fluorescence Quenching with Graphene

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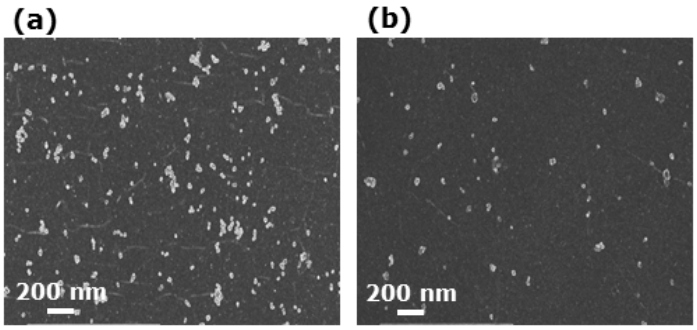
Supporting Information

1. **Synthesis of Compound 4:**

Trimethylsilyl diazomethane, 12-aminododecanoic acid and aqueous hydroxylamine, NHS Biotin (III) were all purchased from Sigma Aldrich and used as received. Trimethylsilyl diazomethane (2M solution in hexane, 6 ML, 12 mmole) was added to a suspension of 12-aminododecanoic acid in a mixture of tetrahydrofuran (10 ML) and methanol (10 ML) and the mixture was stirred at room temperature overnight. The cloudy solution was filtered through filter paper and the filtrate was evaporated at reduced pressure to give methyl 12-aminododecanoate as white crystalline compound. NMR (CDCl3); δ 3.65 (s, 3H), 2.67 (t, j= 7.2 Hz), 2.30 (t, j=7.6 Hz), 0.8-1.65 (m, 20 H). 12- Aminoundecane hydroxamic acid (II). Methyl 12-aminoundecanoate (916 mg, 4 mmole) was added to a mixture of terahydrofuran (10 ML) and methanol (5 ML). To this solution was added 2 ML of 50% aqueous hydroxaylamine and 50 mg of sodium cyanide and the mixture was stirred at room temperature overnight. The white precipitate was filtered, washed with copious amount of water and dried in air. The white powder was used without further purification. NMR (DMSO-d6), d (2.6 broad t, 2 H), 2.1 (broad t, 2H), 1-1.5 (m, 20 H).

2. **Surface density of the SA on the graphene modified with long and short chain linkers.**



(a) Graphene surface modified with the Diazonium –Biotin compound and SA-coated magnetic beads; this system achieves 4 nm above the graphene. (b) Graphene surface modified with the 11-aminoundecylhydroxamic acid followed by applying NHS biotin and SA-coated magnetic beads; this system achieves 7 nm above the graphene. These SEM images shows that in the second case the surface coverage is almost half that of the first case.