

Supplementary Data

Capillary Column Coated with Graphene Quantum Dots for Gas Chromatographic Separation of Alkanes and Aromatic Isomers

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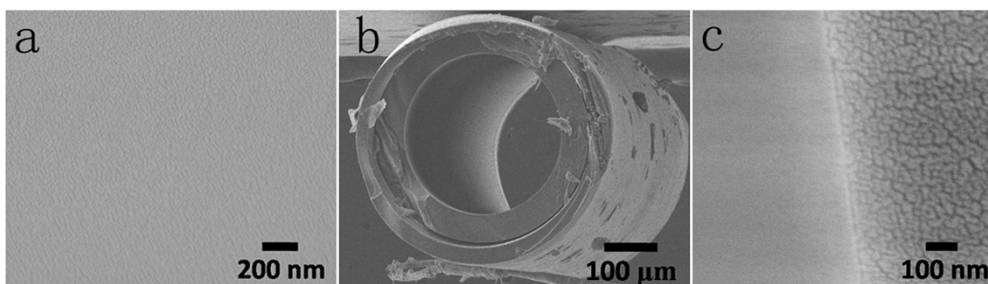


Fig. S1 (a) Typical SEM images of bare fused silica capillary wall treated with 1 M NaOH for 2 h; (b) the SEM image of the GQDs coated capillary column; (c) SEM image of the cross section view of the cut capillary column.

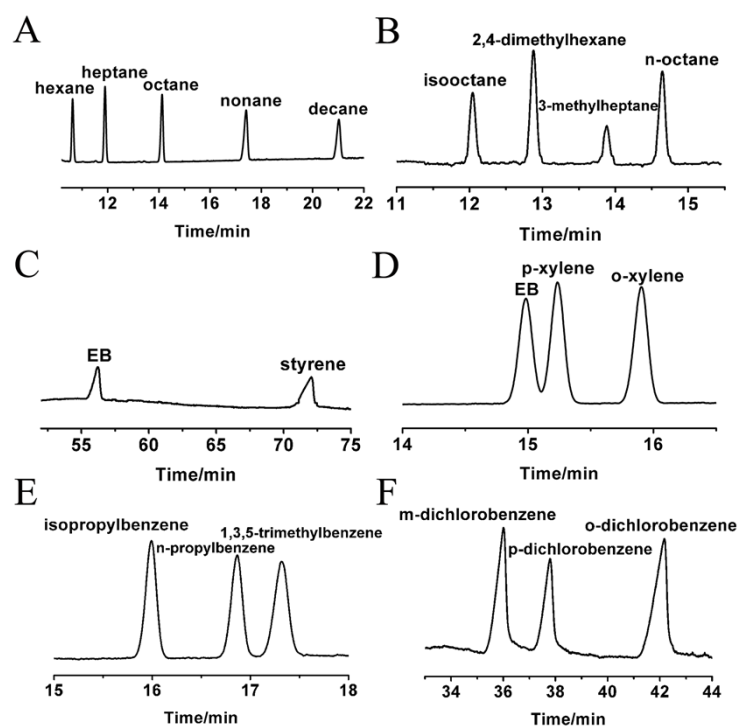


Fig. S2 Gas chromatograms on the commercial HP-5 capillary column (30 m long \times 0.32 mm i.d. \times 0.25 μ m film thickness) at a N_2 flow rate of 0.7 mL min^{-1} for the separation of: (A) hexane, heptane, octane, nonane, decane at 80 $^{\circ}\text{C}$ for 10 min, then 15 $^{\circ}\text{C min}^{-1}$ to 170 $^{\circ}\text{C}$; (B) isooctane, 2,4-dimethylhexane, 3-methylheptane, n-octane at 80 $^{\circ}\text{C}$ for 11 min, then 10 $^{\circ}\text{C min}^{-1}$ to 140 $^{\circ}\text{C}$; (C) EB and styrene at 40 $^{\circ}\text{C}$; (D) EB, p-xylene and o-xylene using a temperature program of 100 $^{\circ}\text{C}$ for 11 min, then 10 $^{\circ}\text{C min}^{-1}$ to 170 $^{\circ}\text{C}$; (E) isopropylbenzene, n-propylbenzene, 1,3,5-

trimethylbenzene at 110 °C for 12 min, then 10 °C min⁻¹ to 160 °C ; (F) m-, p-, o-dichlorobenzene at 80 °C.

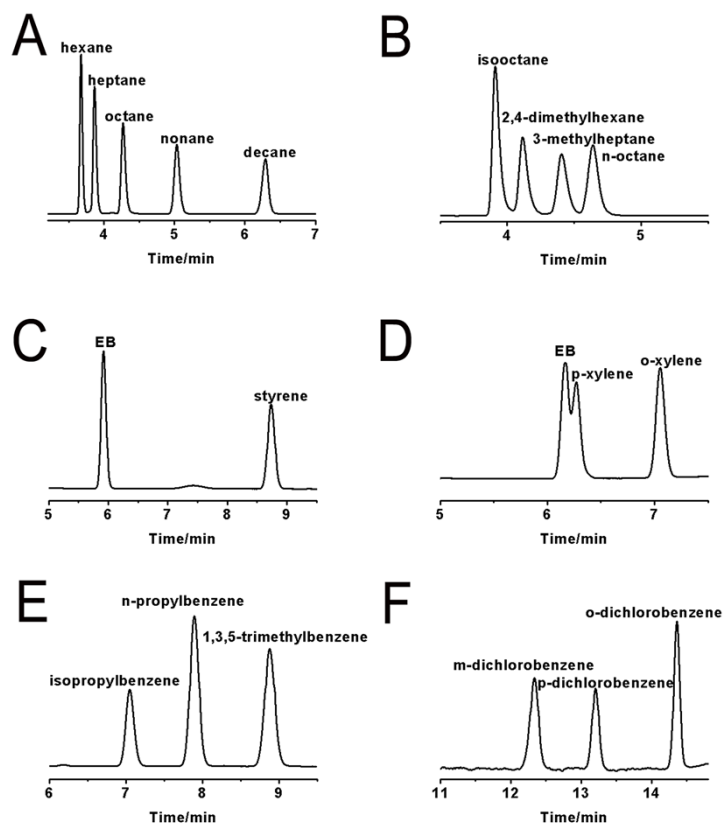


Fig. S3 Gas chromatograms on the commercial HP-innowax capillary column (20 m long \times 0.32 mm i.d. \times 0.25 μ m film thickness) at a N₂ flow rate of 0.7 mL min⁻¹ for the separation of: (A) hexane, heptane, octane, nonane, decane at 70 °C for 3.5 min, then 10 °C min⁻¹ to 120 °C; (B) isooctane, 2,4-dimethylhexane, 3-methylheptane, n-octane at 60 °C; (C) EB and styrene at 100 °C; (D) EB, p-xylene and o-xylene using a temperature program of 100 °C for 6 min, then 10 °C min⁻¹ to 130 °C; (E) isopropylbenzene, n-propylbenzene, 1,3,5-trimethylbenzene at 100 °C; (F) m-, p-, o-dichlorobenzene using a temperature program of 110 °C for 12 min, then 20 °C min⁻¹ to 180 °C.

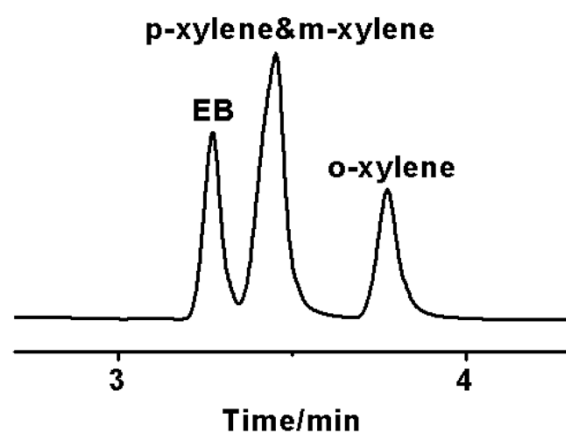


Fig. S4 Gas chromatograms on the GQDs coated capillary column (22 m long \times 0.32 mm i.d.) at a N_2 flow rate of 0.7 mL min^{-1} for the separation of EB, m-xylene, p-xylene, o-xylene at 55°C .

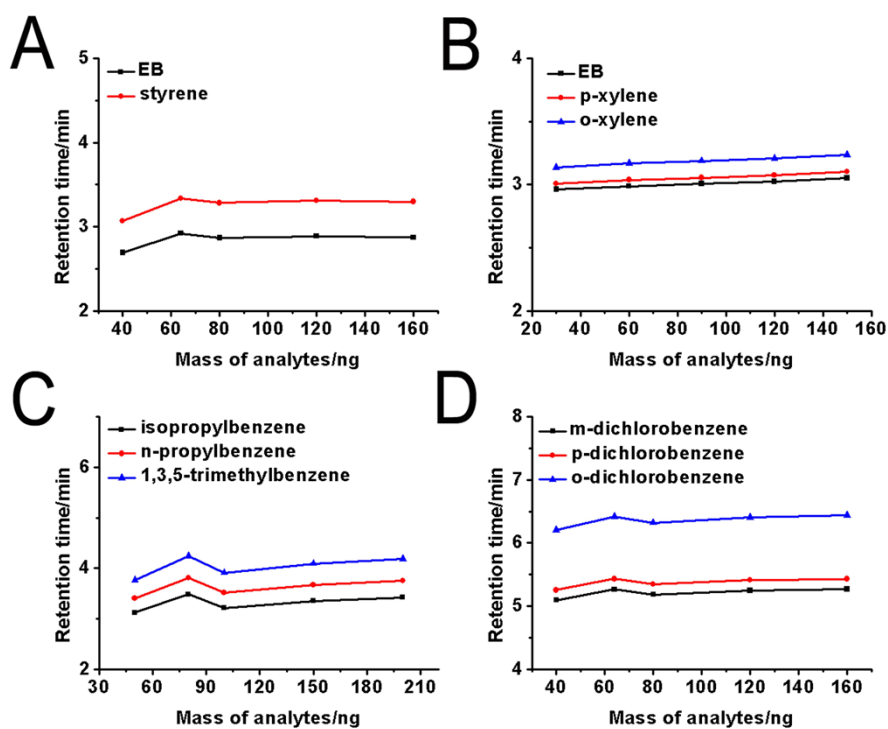


Fig. S5 Effect of injected analyte mass on the retention time for the separation of: (A) EB and styrene; (B) EB and xylene isomers; (C) propylbenzene isomers; (D) dichlorobenzene isomers.

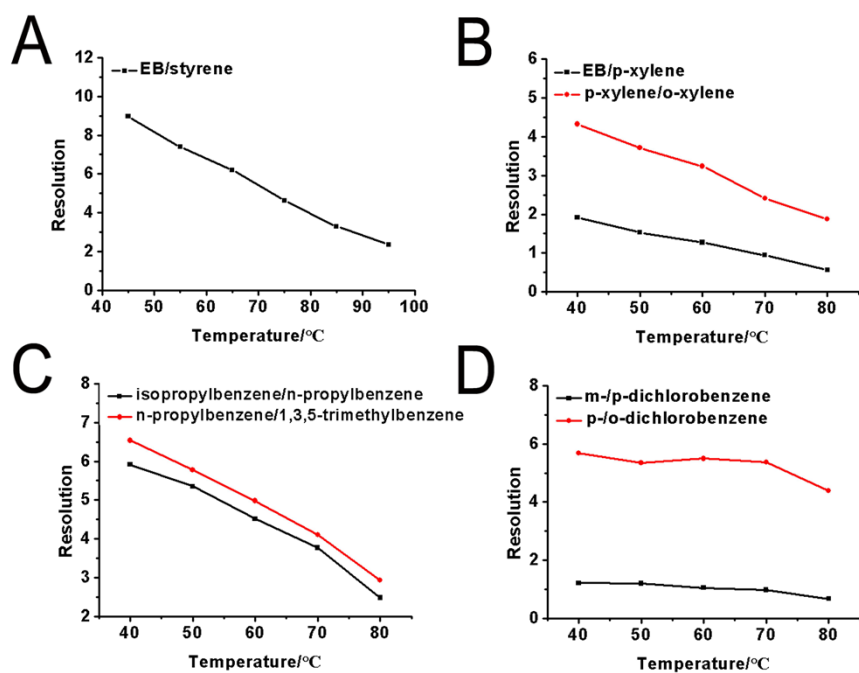


Fig. S6 Influence of temperature on resolution for the separation of (A) EB and styrene; (B) EB and xylene isomers; (C) propylbenzene isomers; (D) dichlorobenzene isomers.