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Electronic Supplementary Information
Simple method for the fluorinated functionalization of Graphene Oxide

Linyu Pu,[a] Yongjun Ma,[a] Wei Zhang,[b] Hailong Hu,[c] Yong Zhou,[d] Qionglin Wang[b] and Chonghua Pei*[a]

1. Experimental

1.1. Production of GO

GO was prepared and purified according to the modified Hummers' method with additional $KMnO_4$ from graphite powders. In a typical reaction, 3 g of graphite, 1.5 g of NaNO3, and 69 mL of concentrated H_2SO_4 were stirred together in an ice bath. Next, 9 g of $KMnO_4$ was added slowly in portions to keep the reaction temperature below 20 °C. The reaction was warmed to 35 °C and stirred for 7 h. Additional 9 g of $KMnO_4$ was added in one portion, and the reaction was stirred for 12 h at 35 °C until the mixture turned mushy. The mixture was then cooled to room temperature, poured onto 400 mL of ice water with 3 mL of 30% H_2O_2, turning the color of the solution from dark brown to yellow. The mixture was then sifted through a sieve of 300 μm. The filtrate was centrifuged (4000 rpm for 4 h), and the supernatant was decanted away. The remaining solid material was then washed in succession with 200 mL of water, 200 mL of 30% HCl, and 200 mL of ethanol (2×); for each wash, the mixture was sifted through the sieve of 300 μm and then centrifuged (4000 rpm for 4 h) and the supernatant decanted away. The solid obtained was vacuum-dried overnight at 60 °C.

1.2. Production of FGO

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In a typical procedure, 200 mg of GO was shaped into a 5*5 mm cylinder. Then the cylinder was put into a nickel tube whose internal diameter is 8mm. Finally, anhydrous hydrogen fluoride was passed through the equipment for 60 min at 50 °C, 70 °C, 90 °C, 110 °C, and 130 °C, respectively.

1.3. Characterization

Atomic force microscope (AFM) images were obtained using a SPA300HV microscope. A sample of the diluted dispersion was placed on synthetic mica as an atomically smooth support and evaporated at 60 □.X-ray diffraction (XRD) experiments were performed with a PANalytical X'Pert PRO instrument. Raman spectra were obtained using an InVia Reflex Raman spectrometer (Renishaw) with a crystal laser excitation of 514.5 nm. Transmission electron microscope (TEM) was carried out using a JEOL-2010 instrument.

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2. Supporting figures

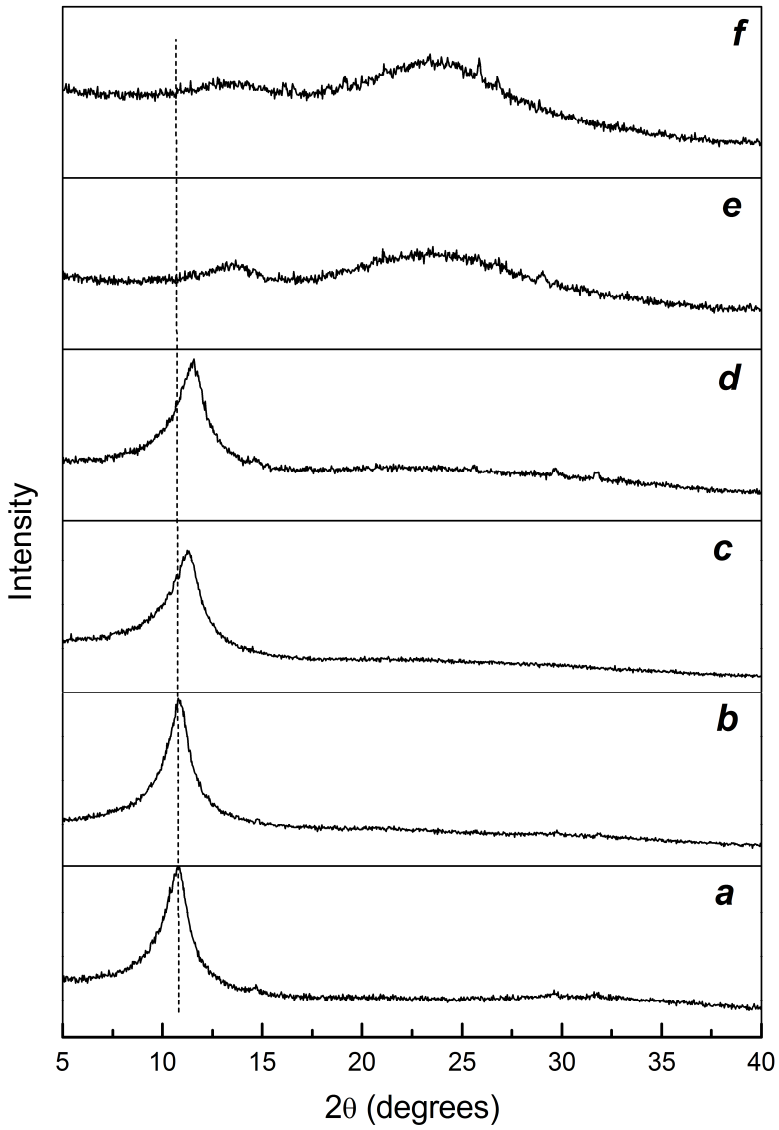

Fig. S1 XRD patterns of GO (a) and FGO obtained at 50 °C (b), 70 °C (c), 90 °C (d), 110 °C (e) and 130 °C (f).

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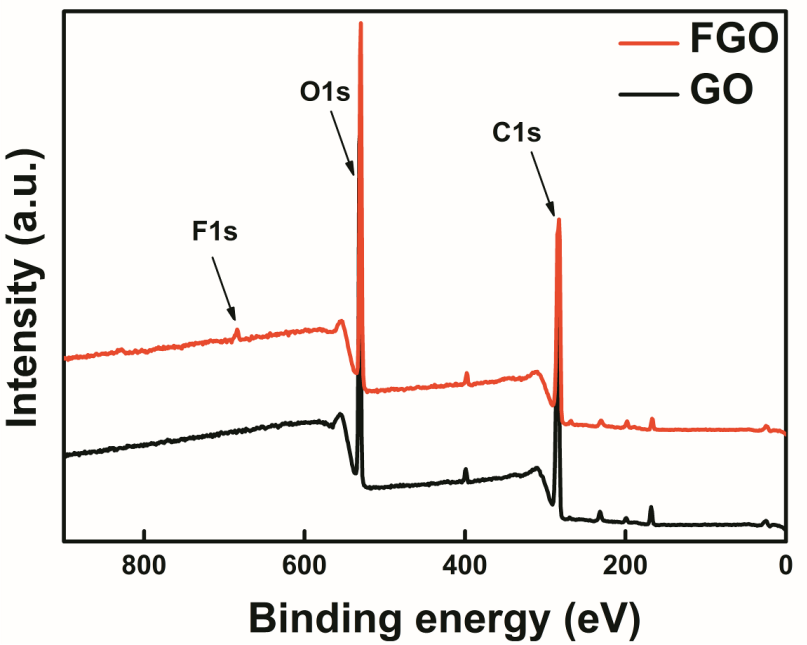

Fig. S2 Survey XPS spectra of GO and FGO.

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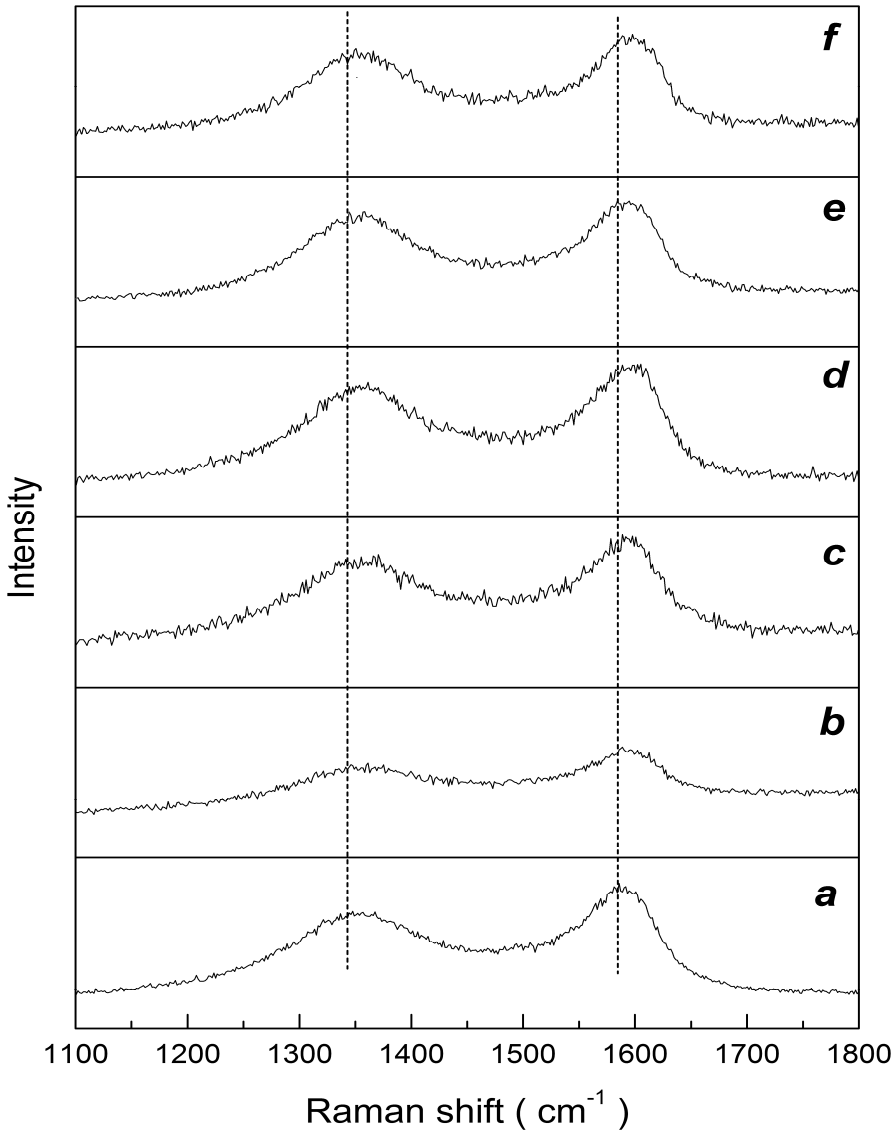

Fig. S3 Raman spectra of GO (a) and FGO obtained at 50 °C (b), 70 °C (c), 90 °C (d), 110 °C (e) and 130 °C (f).