

Electronic Supplementary Information (ESI)

Arynes cycloaddition: Highly efficient chemical modification of graphene

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Experimental Section

Materials

Graphene sheets (95%) were purchased from JIANSIN Scientific & Trading Co. Ltd, China. Cesium fluoride (99%) was purchased from J&K Scientific Ltd. Acetonitrile (99.9%) was purchased from Tianjin Chemicals, China. Aryne precursors were prepared according to literature procedures.¹ Unless otherwise stated, all chemicals were used as received without further purification. De-ionized water (18.2 MΩ) was used throughout the experiments.

Instruments

Transmission electron microscopy (TEM) images were performed on Tecnai G2 F30 electron microscope operating at 100 kV. Atomic force microscope (AFM) images were obtained by a Agilent 5500 SPM systems with tapping mode. Thermogravimetric analysis (TGA) was measured under an argon atmosphere to 900 °C with a Perkin Elmer Thermal Analyzer at a heating rate of 10 °C min⁻¹. X-ray photoelectron spectroscopy (XPS) analysis was carried on PHI-5702 X-ray photoelectron spectrometer. Fourier transform infrared spectroscopy (FTIR) was obtained as KBr discs on a Bomem MB-100 FT-IR spectrometer. UV–Vis absorption spectra were recorded using a T6 UV–Vis spectrometer. Raman spectra were obtained by inVia Reinshaw confocal spectroscopy with 633nm laser excited.

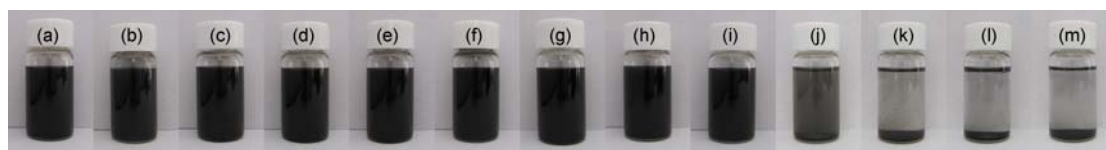


Fig. S1 Photographs of AGs dispersions in various solvents. The AGs can be dispersed well in (a) ODCB, (b) Ethanol, (c) CH_3Cl , (d) Water, (e) NMP, (f) Pyridine, (g) Toluene, (h) Benzene and (i) Methanol. However, the AGs exhibited poor solubility in (j) THF, (k) Acetone, (l) Diethyl ether and (m) DMSO. Probably, it is due to the difference on the interaction between solvent molecules and the modified arynes groups.

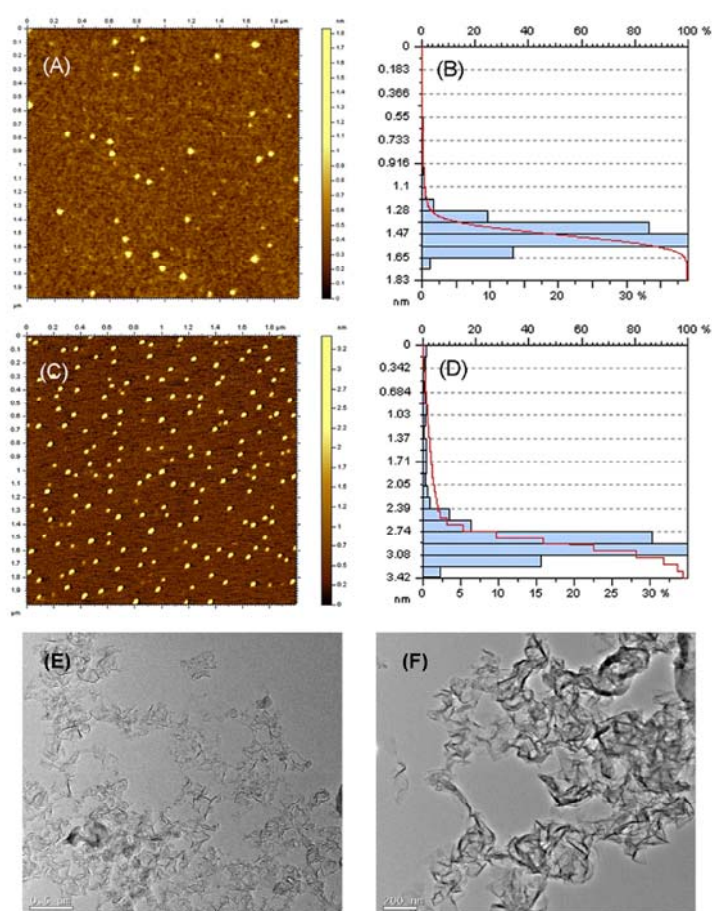


Fig. S2 Additional AFM images of the Gs and the Me-AG: (A) shows AFM images of the Gs, (B) shows the height of the Gs ranges from 1.3 to 1.6 nm; (C) shows AFM images of the Me-AG, (D) shows the height of the Me-AG sheets ranges from 2.8 to 3.2 nm. Additional HRTEM images of the Gs and the Me-AG: (E) HRTEM image of the Gs. Scale bar is 0.5 μm ; (F) HRTEM image of the Me-AG. Scale bar is 200 nm.

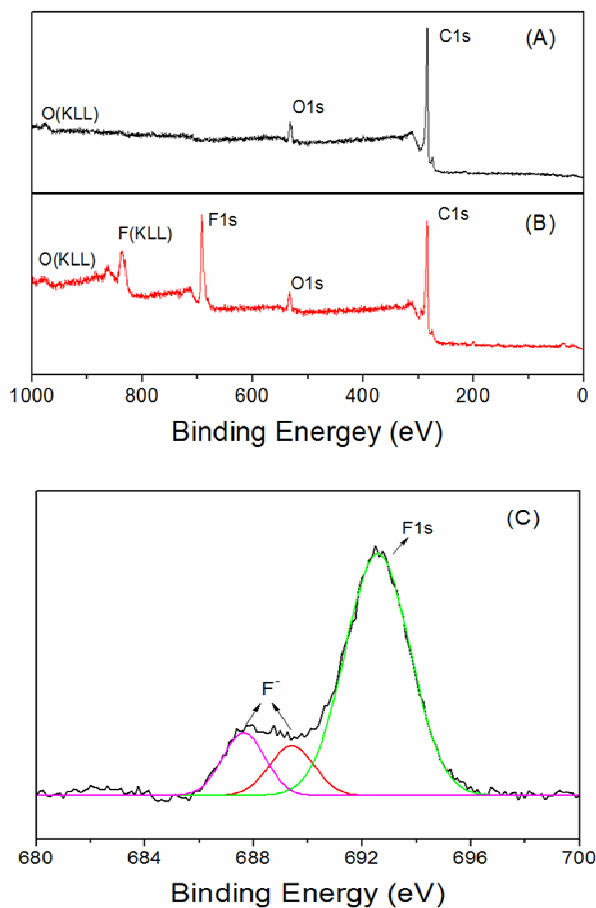


Fig. S3 Survey XPS data for the Gs (A) and the F-AG (B); (C) shows higher resolution data of the F1s of the F-AG.

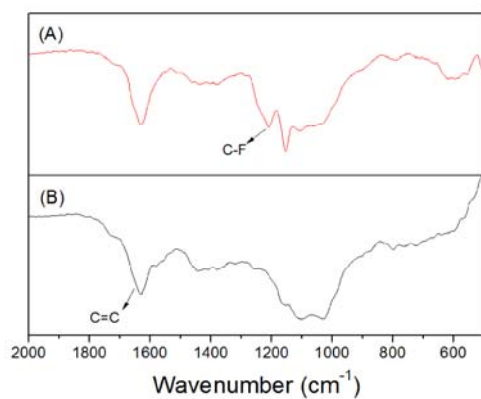


Fig. S4 FT-IR of the F-AG (A) and the Gs (B)

References

1. H. Yoshida, J. Ikadai, M. Shudo, J. Ohshita and A. Kunai, *J. Am. Chem. Soc.*, 2003, **125**, 6638-6639.