Supporting materials for

Amino-grafted Graphene as Stable and Metal-free Solid Basic Catalyst

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Fig.S1 shows the low resolution TEM and AFM inages of single NEt_3-graphene sheet. Clearly, the crumpling feature make it difficult to measure the thickness of sheet, and it can be measured at the edge of sample by AFM. As shown in Fig.S1c, the thickness of the sheet is about 0.95 nm, indicating the NEt_3-graphene sheet is in single layer.

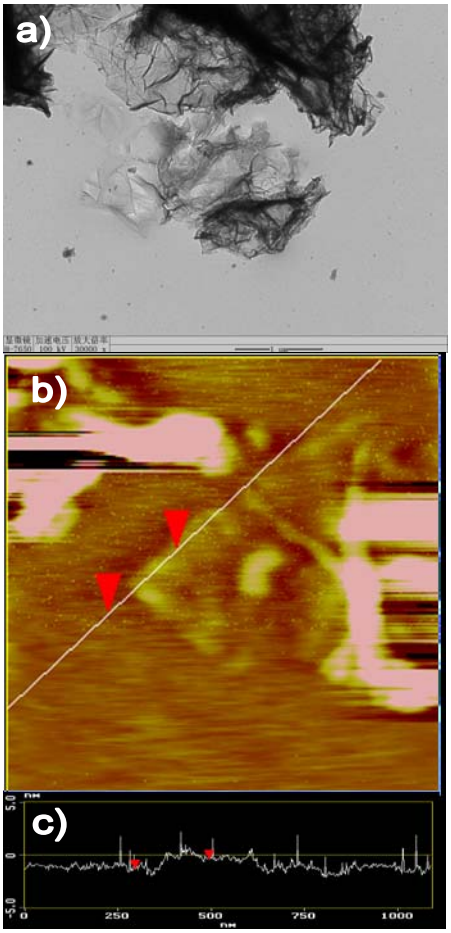

Fig. S1 Low resolution TEM (a) and AFM (b) images of single NEt_3-graphene sheet, and the section line of it (c).

Figure S2 shows the FT-IR spectra of GO, r-GO and NEt_3-graphene. For GO, the characteristic peaks appear for carboxy C-O (1733 cm^{-1}), aromatic (1624 cm^{-1}), carboxy C-O (1414 cm^{-1}), and epoxy C-O (1229 cm^{-1}).[1] After reduction, the peaks for the oxygen functional groups were reduced significantly. For NEt_3-graphene the FT-IR spectrum looks very similar to rGO and the result is the same as to NEt_3-CNT, and Graupner suggested amino-modification of canbon is difficult to be directly measured by FT-IR.[2]

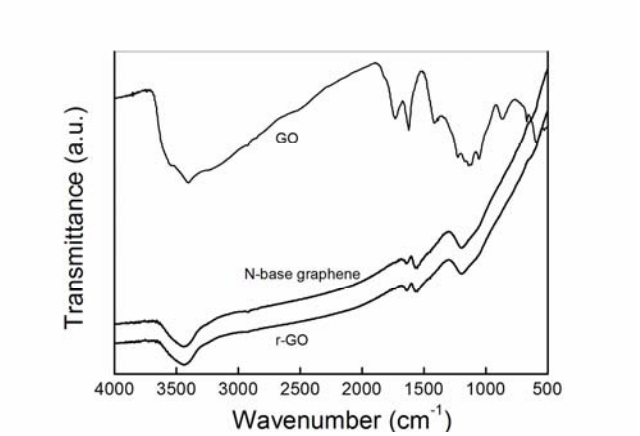

Fig.2S FT-IR spectra of GO, rGO and NEt_3-graphene.

The content of nitrogen can also be measured by by energy-dispersive X-ray spectroscopy (EDX) attached to SEM. As shown in Figure S3, the characteristic peak for nitrogen can be clearly found, also indicating the successful grapfting of amino groups onto graphene. At the same time, the EDS didn't show any characteristic peak of Li (~0.055 KeV) and therefore the high activity of the NEt_3-graphene basic catalyst can not be attributed to Li impurities that originate from the n-BuLi employed in the synthesis.

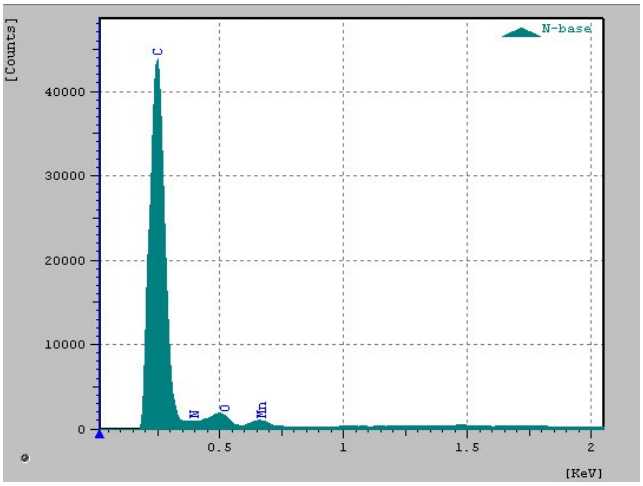

Fig.3S The EDS spectrum of the NEt_3-graphene.

References

1. W. Chen, L. Yan and P. R. Bangal, *Carbon*, 2010, **48**, 1146-1152
2. R. Graupner, J. Abraham, D. Wunderlich, A. Vencelová, P. Lauffer, J. Röhrl, M. Hundhausen, L. Ley and A. Hirsch, *J. Am. Chem. Soc.*, 2006, **128**, 6683-6689.