

Electronic Supporting Information (ESI†)

**Preparation of reduced graphene oxide/zirconia nanocomposite
and its application as a novel lubricant oil additive**

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1. AFM image of rGO

The surface morphology and structure of as-prepared rGO was observed by a Nanoscope IIIa multimode atomic force microscope (AFM, Veeco) in tapping mode. As shown in Fig. S1, the obtained rGO nanosheets are uniform. Based on the cross section analysis, the thickness of rGO nanosheets is determined to be 2.2 ~ 2.5 nm. It is well known that the theoretical value of a perfectly flat sp²-carbon atom network is 0.34 nm, in fact, it is natural that the thickness of monolayer graphene flakes is larger than 0.34 nm. In view of thickness of monolayer rGO (0.87±0.09 nm) reported^[1], it

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can be concluded that the layer number of as-prepared rGO are 2-4 layers. Overall, this result demonstrates that few-layer rGO nanosheets have been effectively synthesized.

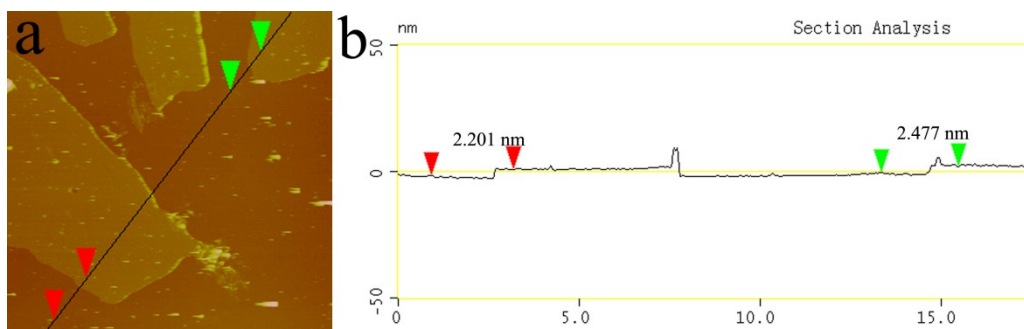


Fig. S1 AFM image of as-prepared rGO nanosheets (a) and the corresponding cross section analysis (b). The scanning area of (a) is $14 \times 14 \mu\text{m}^2$. (A color version of this figure can be viewed online)

Notes and references

1. D. D. Kulkarni, S. Kim, M. Chyasnachyus, K. Hu, A. G. Fedorov and V. V. Tsukruk, *J. Am. Chem. Soc.*, 2014, **136**, 6546–6549.