Electronic Supplementary Information for

Enhanced Hydrogenation of Olefins and Ketones with Ruthenium Complex Covalently Anchored on Graphene Oxide

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1. Experimental Section

1.1 Control experiments

To verify the crucial role of the aminosilane ligand spacer, control experiments were carried out as follows: 200 mg of GO was added to an anhydrous toluene solution of RuCl$_2$(PPh$_3$)$_3$ (150 mg), and the solution was refluxed under N$_2$ atmosphere for 24 h. The mixture was filtrated and washed, followed by freeze-drying. The resulting solid was tested by Quantitative energy dispersive X-ray spectroscopy (EDS) and trace of ruthenium was determined. The resulting solid also showed no inherent catalytic activity in hydrogenation of olefins. These results exclude the possibility of RuCl$_2$(PPh$_3$)$_3$ reacting with GO directly and shows the key role of the aminosilane ligand spacer in the coordination process, which also provide more evidence for the coordination interaction, not a simple physical absorption.
2. Supplementary Figures

Fig. S1 The EDS spectrum of Ru–f–GO. Ruthenium shows an element mass ratio of 1.31 %, which is in line with the XPS analysis.
Fig. S2 Photographs of GO (1), NH$_2$–f–GO (2) and Ru–f–GO (3) dispersed in ethanol. The color changes from yellow to brown and black after the silylation and coordination reactions.
**Fig. S3** SEM and TEM images of (a) (b) GO, (c) (d) NH$_2$–f–GO and (e) (f) Ru–f–GO.
**Fig. S4** (a) SEM image of Ru−f−GO and corresponding quantitative EDS element mapping of (b) N, (c) O and (d) P.
Fig. S5 (a) SEM image of NH$_2$–f–GO and corresponding quantitative EDS element mapping of (b) C, (c) N and (d) Si. All the elements are homogeneously distributed on the whole surface of GO.
**Fig. S6** Ru 3p3/2 XPS spectra of (a) RuCl$_2$(PPh$_3$)$_3$, (b) Ru–f–GO before the hydrogenation reactions and (c) Ru–f–GO after the hydrogenation reactions.