*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

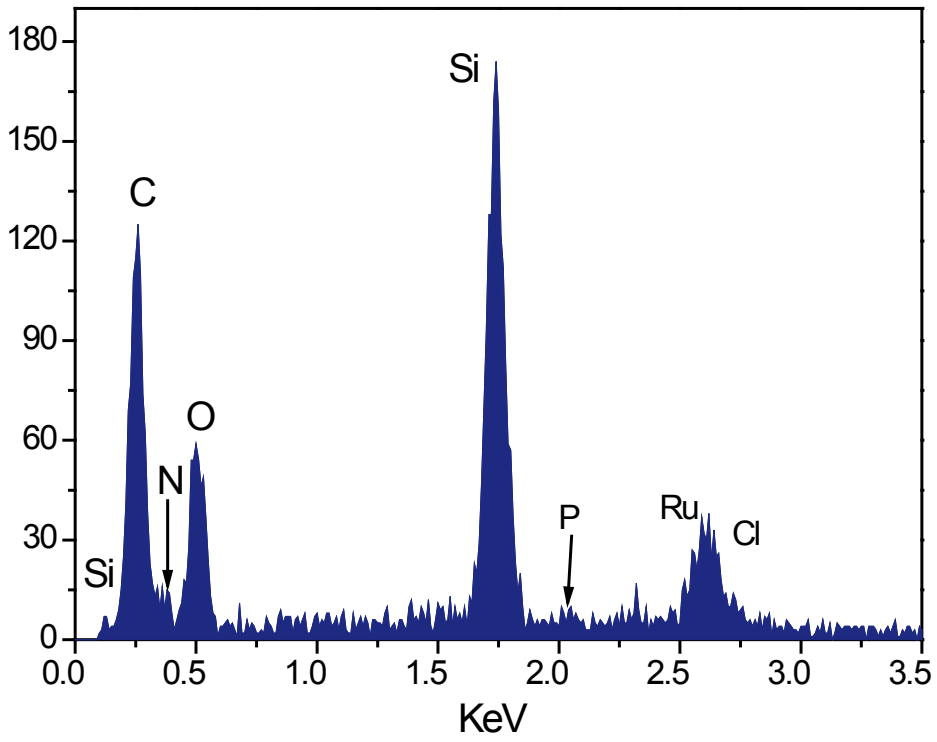


**Fig. S1** The EDS spectrum of Ru–*f*–GO. Ruthenium shows an element mass ratio of 1.31 %, which is in line with the XPS analysis.


**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.

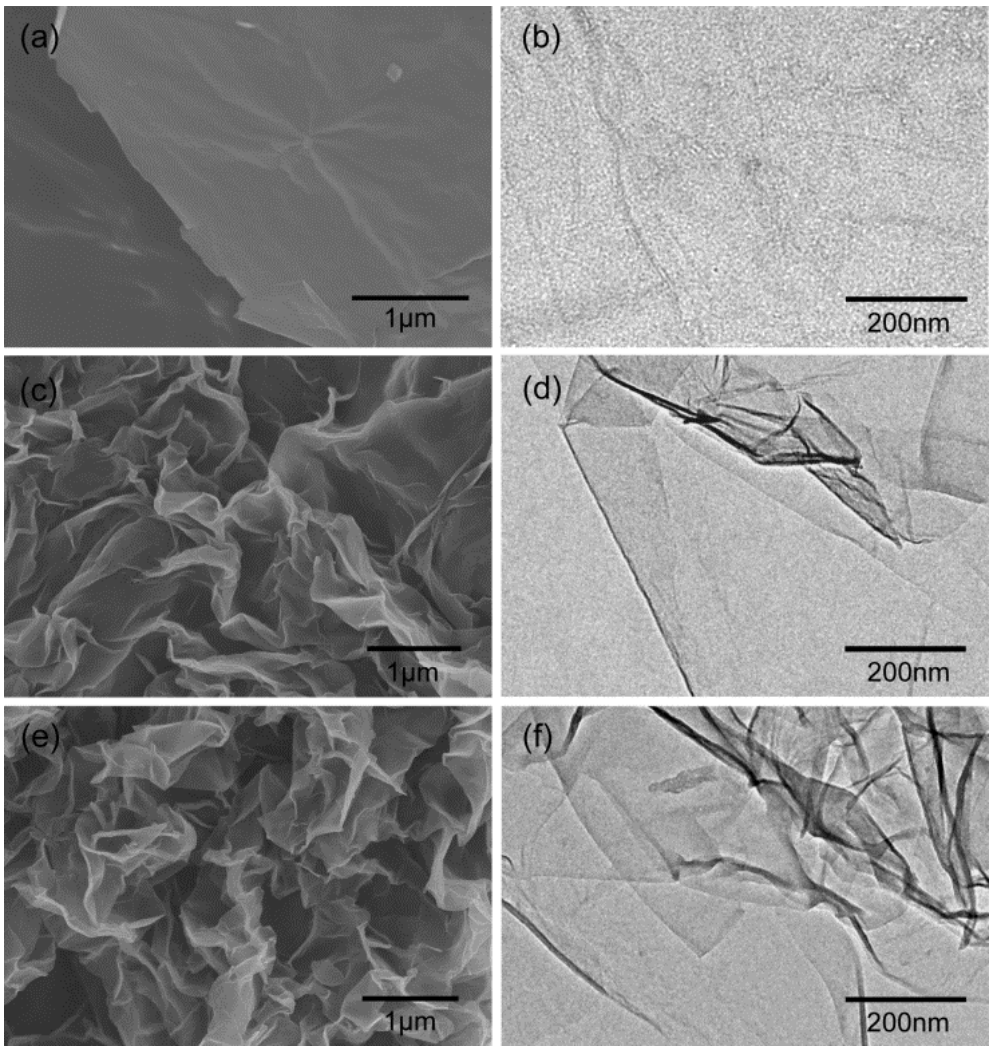


**Fig. S3** SEM and TEM images of (a) (b) GO, (c) (d) $NH_2$–*f*–GO and (e) (f) Ru–*f*–GO.

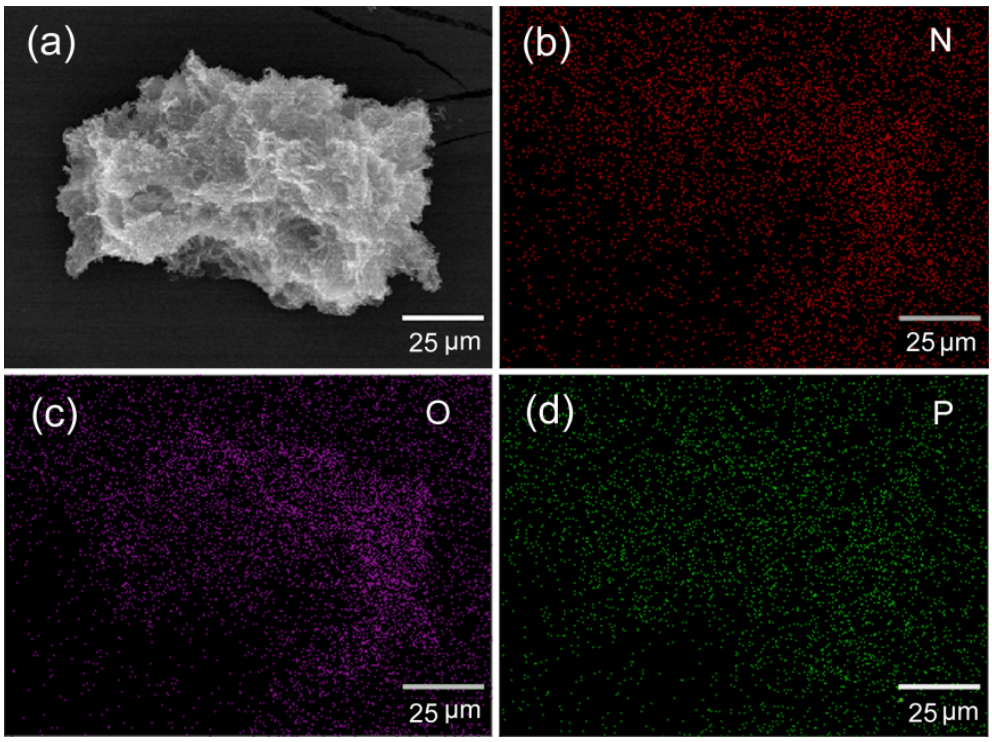


**Fig. S4** (a) SEM image of Ru–*f*–GO and corresponding quantitative EDS element mapping of (b) N, (c) O and (d) P.

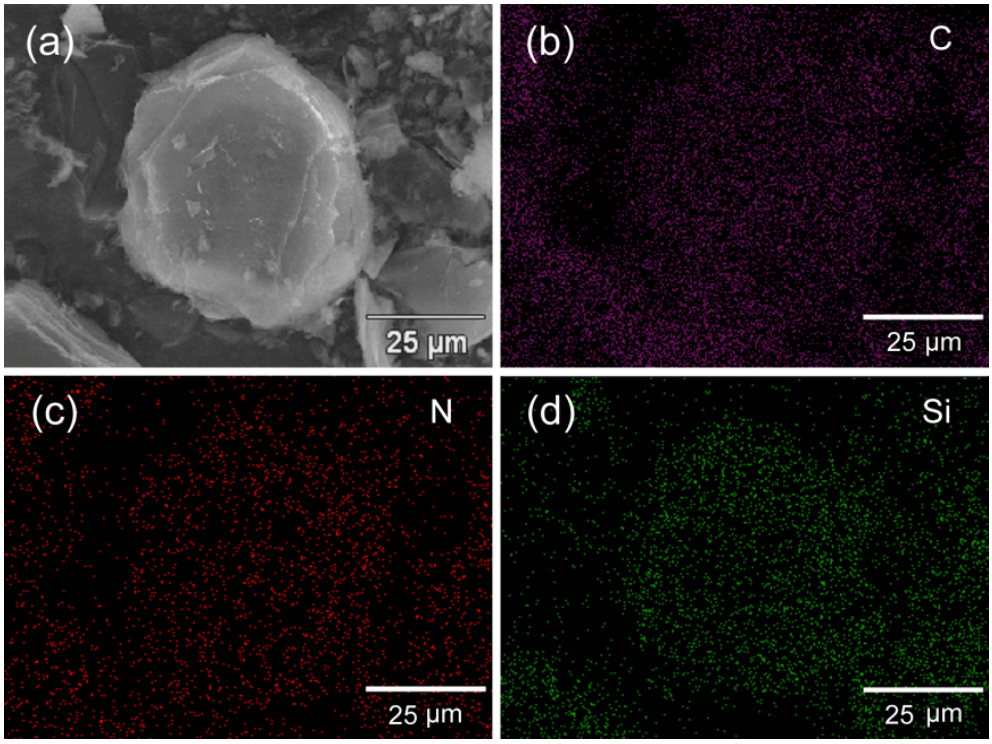


**Fig. S5** (a) SEM image of $NH_2$–*f*–GO and corresponding quantitative EDS element mapping of (b) C, (c) N and (d) Si. All the elements are homogeneously distributed on the whole surface of GO.

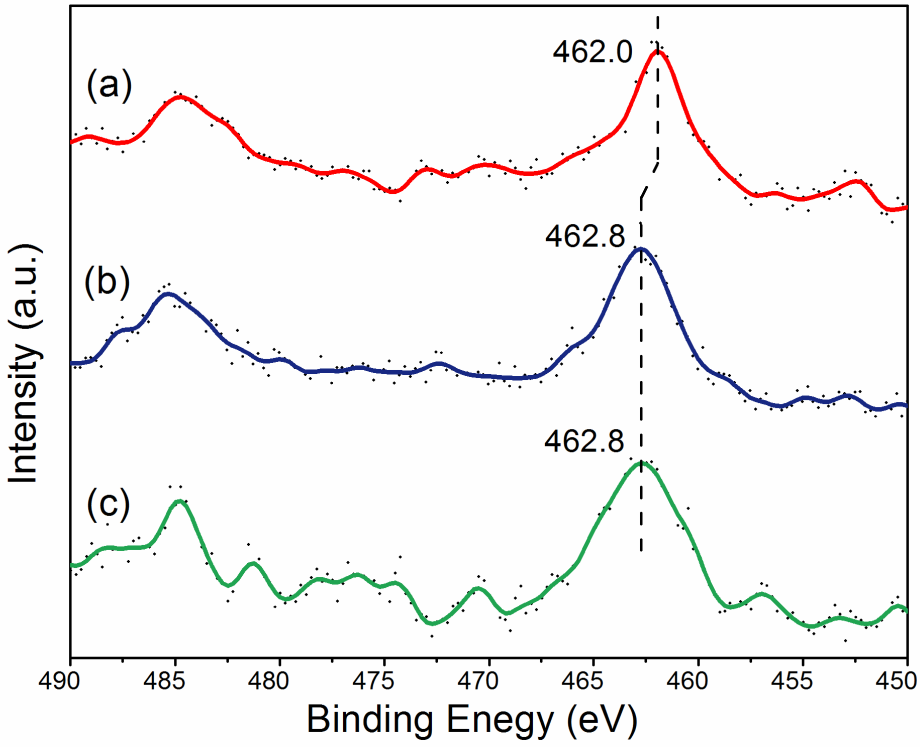


**Fig. S6** Ru 3p3/2 XPS spectra of (a) $Rucl_2(PPh_3)_3$, (b) Ru–*f*–GO before the hydrogenation reactions and (c) Ru–*f*–GO after the hydrogenation reactions.