Electronic Supplementary Information (ESI)

Active and Regioselective Rhodium Catalyst Supported on Reduced Graphene Oxide for 1-Hexene Hydroformylation

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Experimental Section

***Preparation of Graphite Oxide*:** 10.0 g graphite powder and 5.0 g $NaNO_3$ were mixed in a flask cooled in ice bath. 230 mL of concentrated H_2SO_4 solution was added into the above mixture. After stirring for 10 min, $KMnO_4$ was gradually and slowly added into the mixture and then the mixture was under stirring in the ice bath for another 15 min. The flask was put into a water bath at 35 ^oC and stirred for 50 min. Then, 460 mL of water was added into the above mixture evenly and slowly, and the temperature of water bath was quickly increased to 98 ^oC and stirred for another 30min. Finally, 1000 mL of deionized water and moderate 30% H_2O_2 were slowly added into the mixture and stirred for 5 min. The obtained mixture was immediately filtrated and the filter cake was washed by 10% HCl solution for several times to remove residual salt, and then washed by deionized water until the pH > 6. The collected solid was dried under vacuum at 50 ^oC for 48 h.

Pre-treatment of AC and CNTs: AC (40-60 meshes, Kanto Chemical Co. Inc., Japan) was heated in 35% HNO_3 at 90 ^oC for 6 h. CNTs (inner diameter: 20−30 nm; length: 1−10 μm; Chengdu Organic Chemistry Co. Ltd., China) was heated in 65% HNO_3 at 120 ^oC for 14 h. After being refluxed, the sample was washed with deionized water until pH=7, and then dried at 60 ^oC over 12 h.

CO-TPD: Sample was pretreated with Ar gas flow at 150 ^oC for 1 h. After temperature was cooled down to 40 ^oC, the gas was switched to CO for 30 min, and then pure He was introduced to purge for 30 min. The CO-TPD experiment was performed in He flow at a heating rate of 5 $^oC \cdot min^{-1}$, where the desorbed CO was detected by a mass spectrometry.

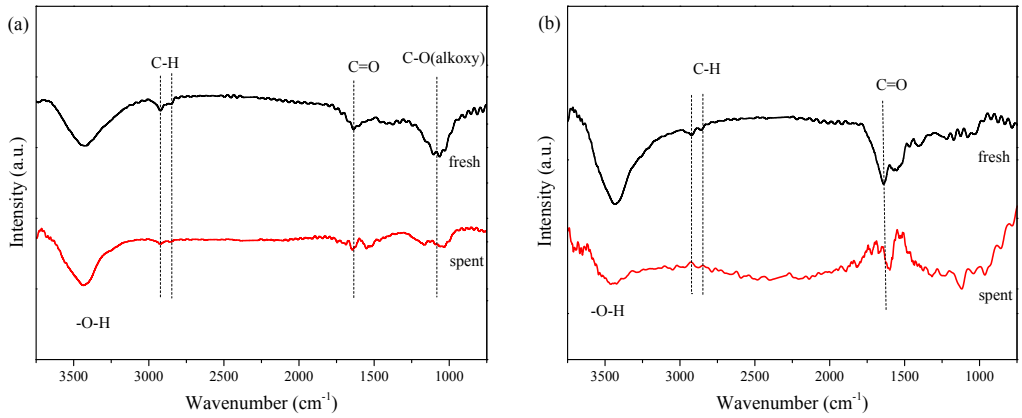

Figure S1 FTIR spectra of Rh/AC (a) and Rh/CNTs (b)

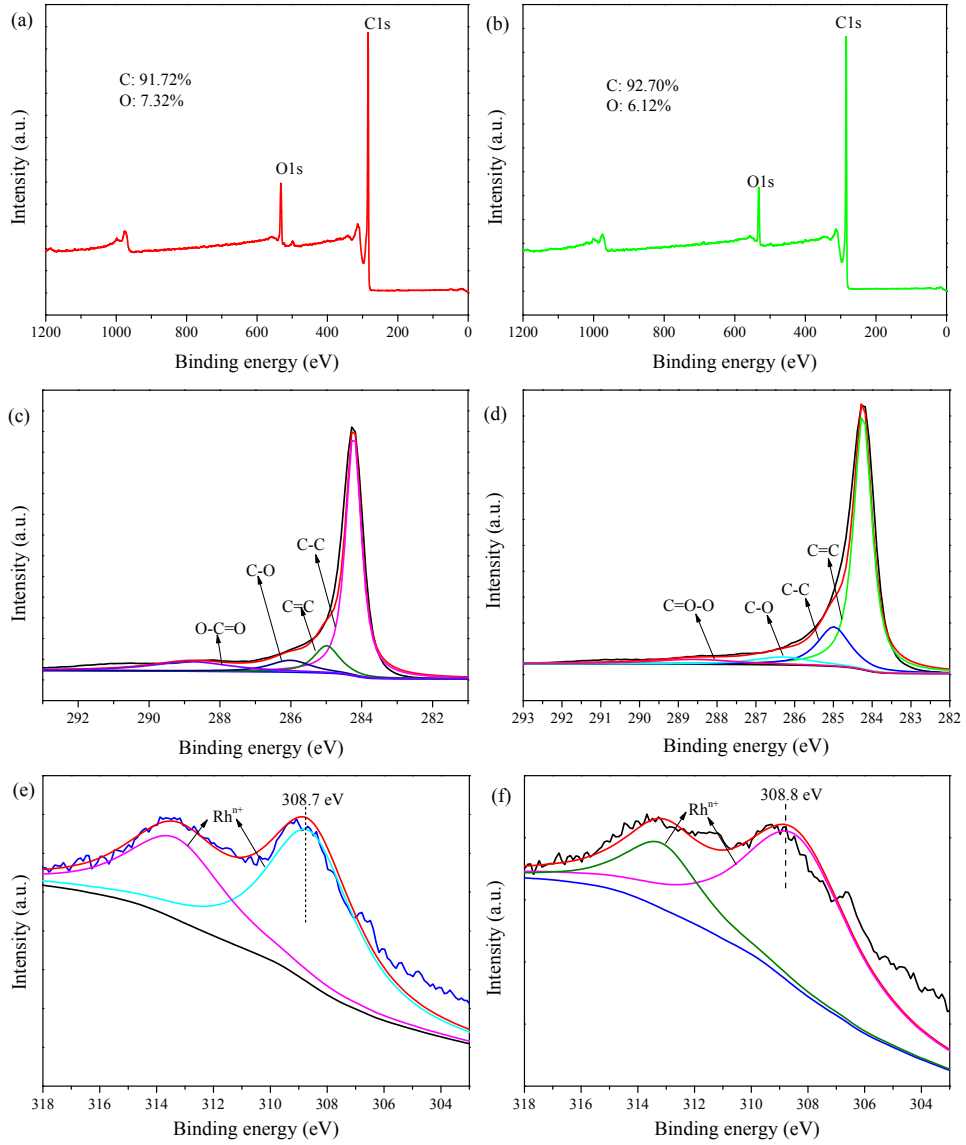

Figure S2 XPS spectra of fresh and spent Rh/CNTs: (a) survey spectra of fresh Rh/CNTs, (b) survey spectra of spent Rh/CNTs, (c) C1s of fresh Rh/CNTs, (d) C1s of spent Rh/CNTs, (e) Rh3d region XPS spectra of fresh Rh/CNTs, (f) Rh3d region XPS spectra of spent Rh/CNTs

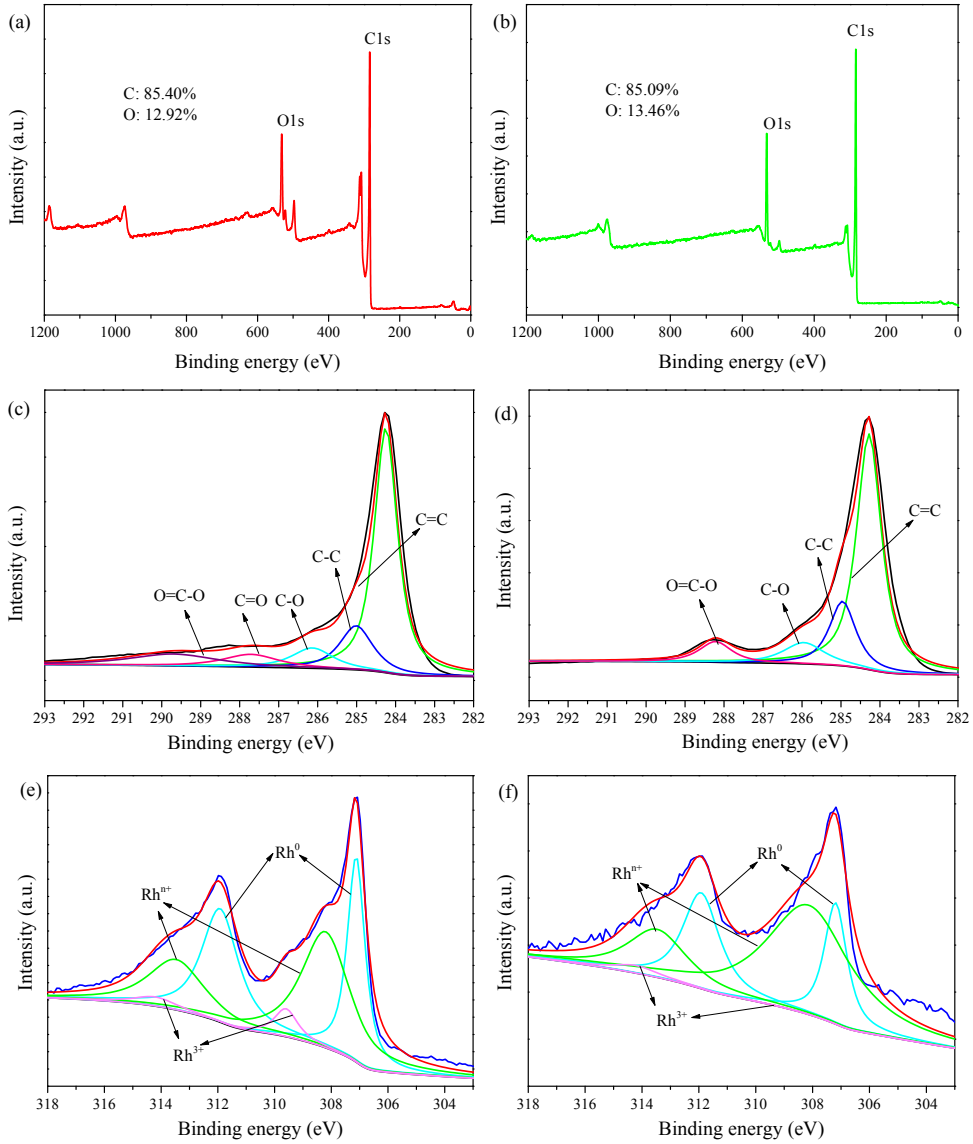

Figure S3 XPS spectra of fresh and spent Rh/AC: (a) survey spectra of fresh Rh/AC, (b) survey spectra of spent Rh/AC, (c) C1s of fresh Rh/AC, (d) C1s of spent Rh/AC, (e) Rh3d region XPS spectra of fresh Rh/AC, (f) Rh3d region XPS spectra of spent Rh/AC

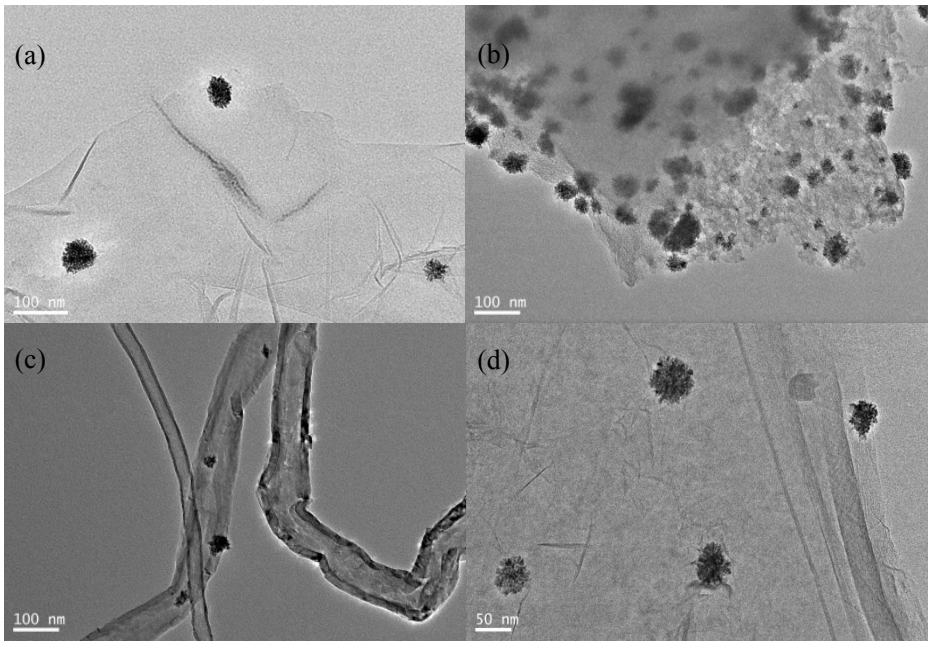

Figure S4 TEM images of Rh/RGO(a), Rh/AC(b), Rh/CNTs(c) and spent Rh/RGO(d)