SUPLEMENTARY INFORMATION

1) Preparation of Ru/TiO_2, Ru/C and Ru/CeO_2 catalysts

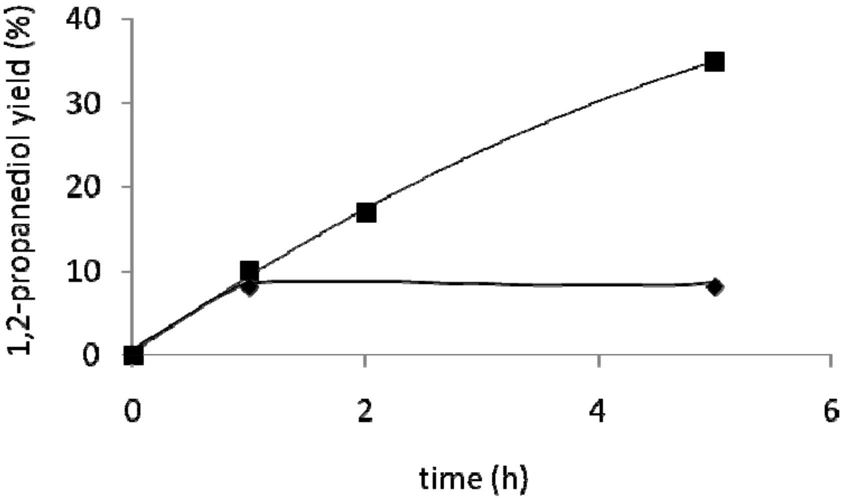
The catalysts were obtained by the deposition-precipitation method.[1] The different supports were commercially available (TiO_2 P25 Degussa and active charcoal from Aldrich) or was prepared by hydrolysis following reported procedures (CeO_2)[2]. The corresponding support was dispersed in a $RuCl_3$ aqueous solution at initial pH 5 with a concentration depending on the ruthenium loading required. The pH value was then set to 7 by addition of diluted NaOH and the slurry was vigorously stirred for 18 h at room temperature. The respective solids (Ru/C, Ru/CeO_2 or Ru/TiO_2) were then filtered and exhaustively washed with distilled water until no traces of chlorides were detected by the $AgNO_3$ test. The final material is dried in an oven at 100 ºC overnight.

2) Reaction procedure

Catalytic experiments were performed in reinforced glass reactors equipped with temperature and pressure controllers. Before reaction, the catalyst is hydrogenated in the same reactor, by submitting it to 20 bar hydrogen pressure and temperature of 180 ºC overnight. For each reaction, the reactant was dissolved in water and placed into the reactor (2 ml capacity) together with the corresponding catalyst (mol ratio substrate/ruthenium of 0.4%). The reactors were sealed and deeply introduced into the silicone bath preheated at the required temperature (150 ºC). The reactions were conducted at 32 bar hydrogen pressure. Caution should be paid when working at this pressures: safety personal items should be worn during handling and the reactor kept under a protective screen. During the experiment, the magnetic stirring rate was fixed at 1000 rpm. Aliquots were taken from the reactor at different reaction times adding dodecane as external standard. Once the catalyst particles were removed from the solution by centrifuging at 12 000 rpm, the products were analyzed by GC-MS (Hewlett-Packard, 35 m capillary column of cross-linked 5% phenyl methylsilicone). For reuse the catalyst, it was separated from the reaction mixture by filtration, and then, generously washed with water and methanol. The recuperated solid is dried in an oven at 100 ºC overnight, being prepared for the following run.

3) Leaching test

Figure S1. Time conversion plot for the lactic acid hydrogenation (850 mg) in water (3.5 ml) at 150 ºC and 40 bar hydrogen pressure catalyzed by Ru(0.64%)/TiO_2 (350 mg). One of the reactions (■) was carried out in the presence of the catalyst, whereas for the other (♦), the solid was filtered while the suspension was still hot and the clear solution was allowed to continue the reaction under the typical experimental conditions but in the absence of any solid.



4) TEM images of the ruthenium catalysts

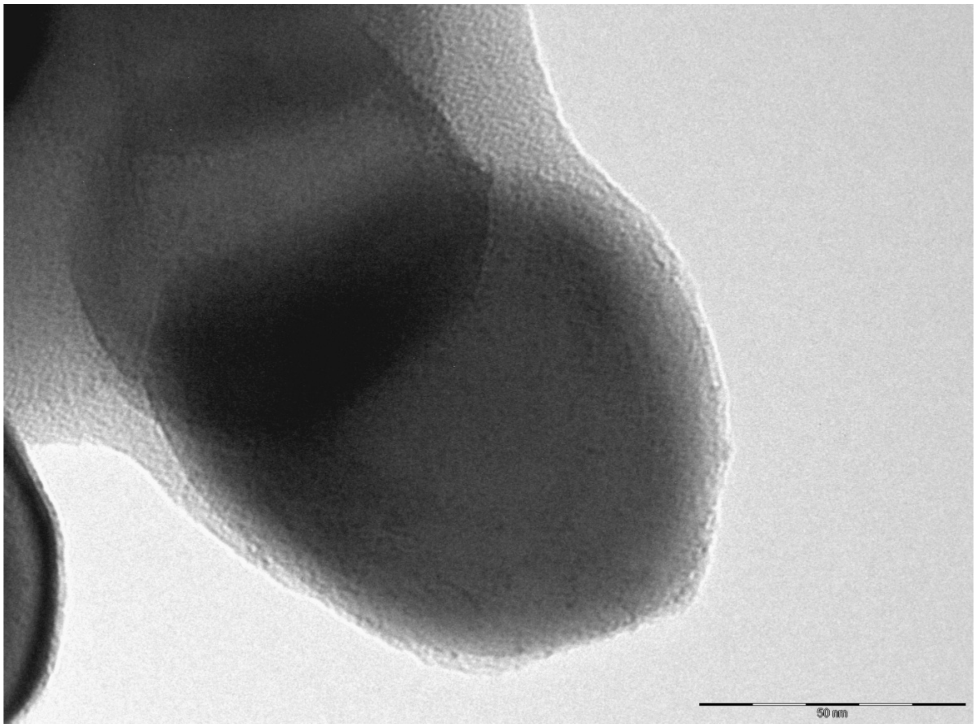


Figure S2. TEM image of Ru (0.64%)/TiO_2. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 2.0 ± 0.1 nm.

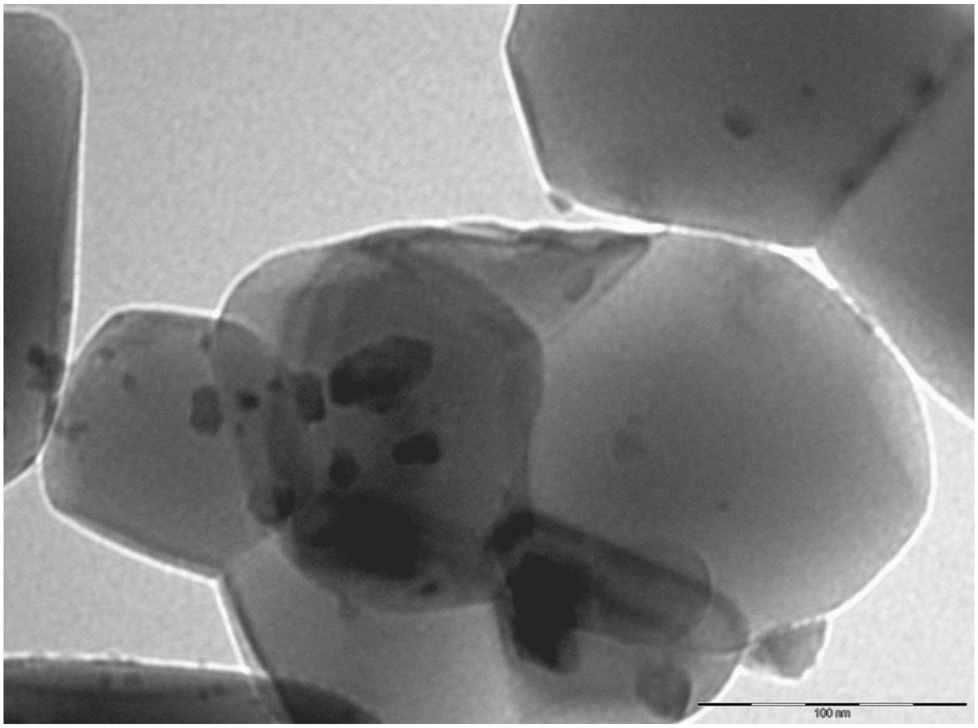


Figure S3. TEM image of Ru (0.64%)/ TiO_2 calcined. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 10.6 ± 0.1 nm.

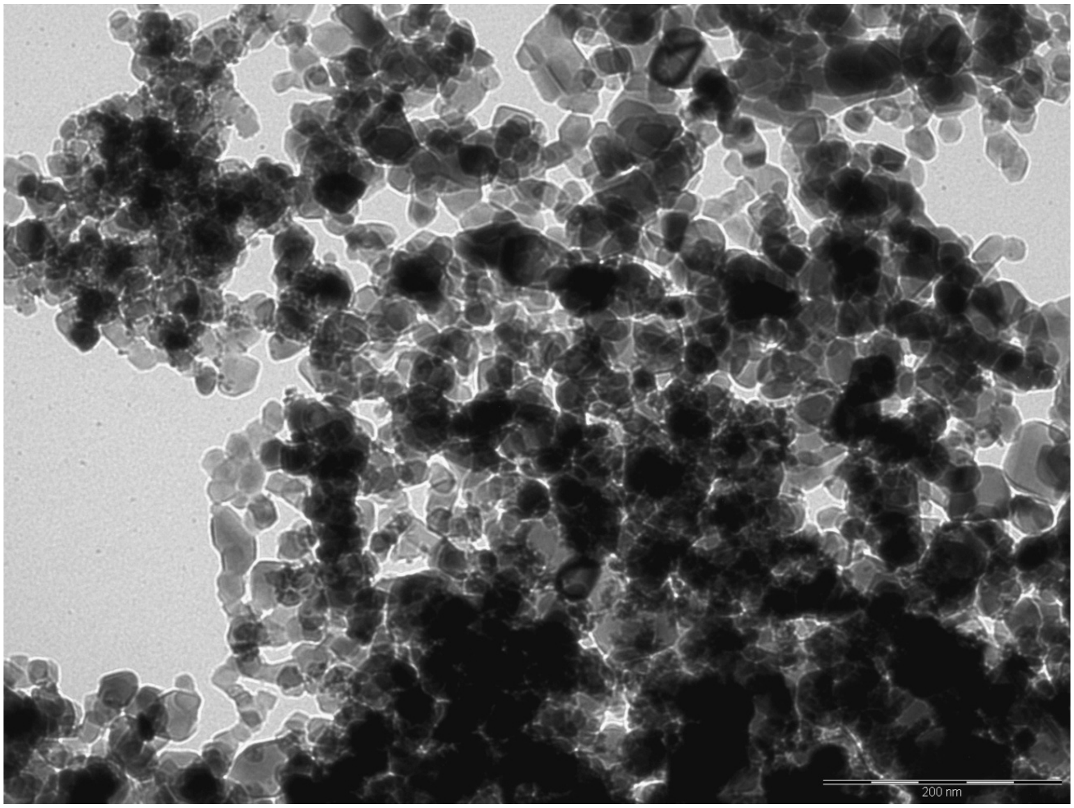


Figure S4. TEM image of Ru (5.7%)/ TiO_2. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 31.4 ± 0.1 nm.

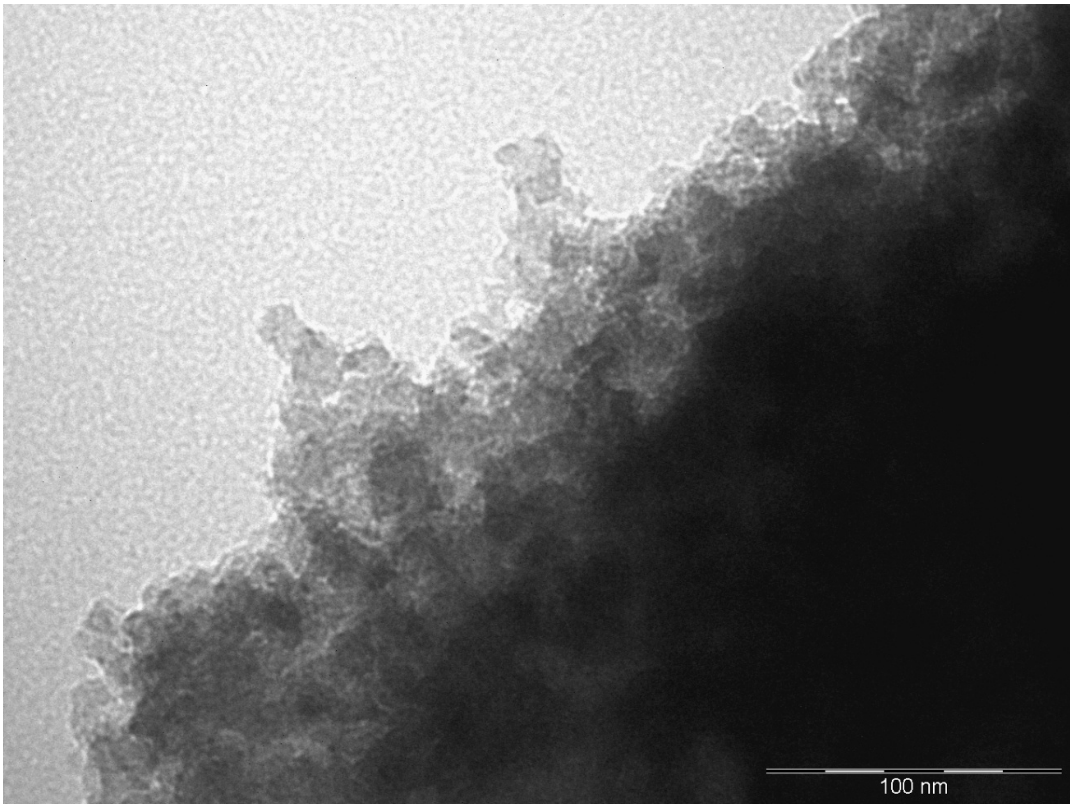


Figure S5. TEM image of Ru (0.5%)/C. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 2.2 ± 0.1 nm.

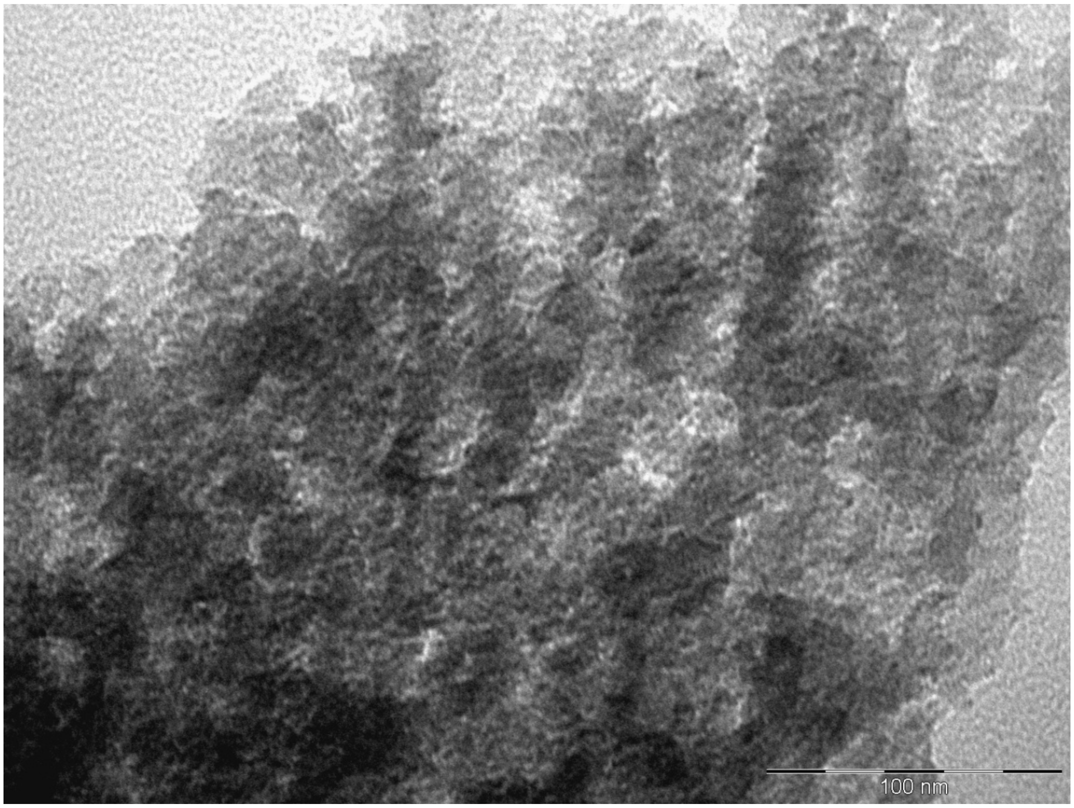


Figure S6. TEM image of Ru (1%)/C. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 2.3 ± 0.1 nm.

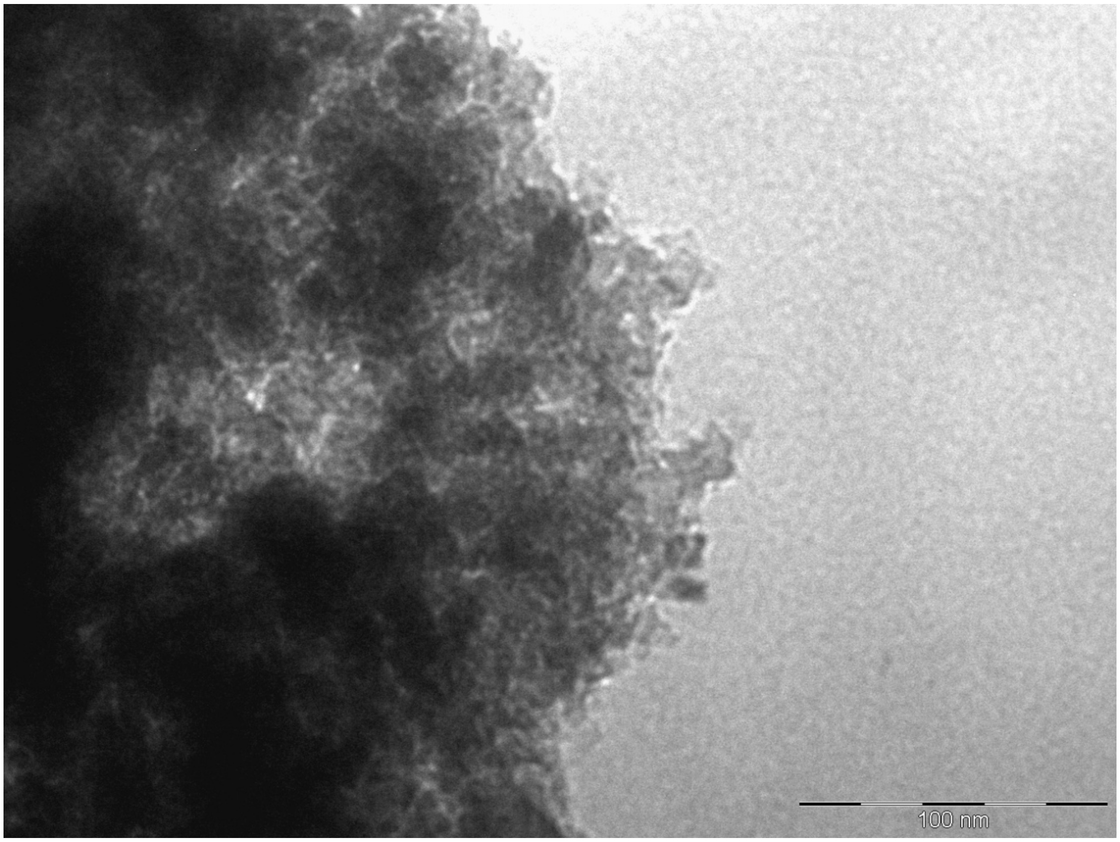


Figure S7. TEM image of Ru (2%)/C. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 2.4 ± 0.1 nm.

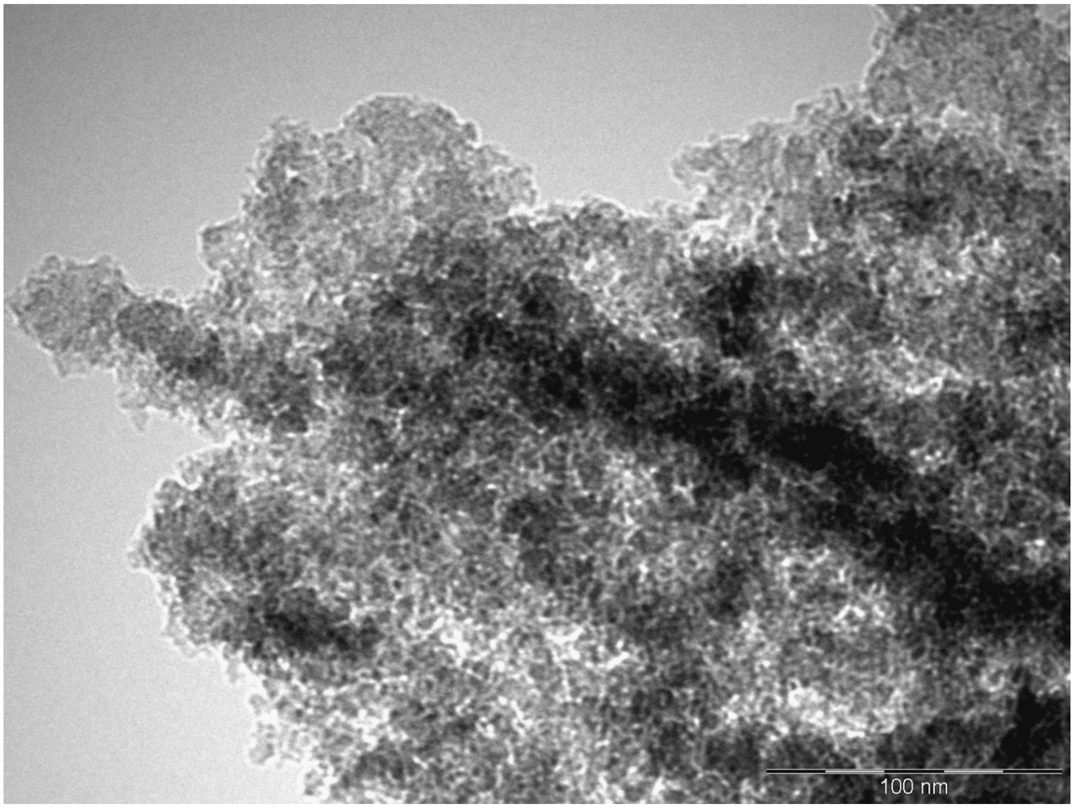


Figure S8. TEM image of Ru (3%)/C. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 2.6 ± 0.1 nm.

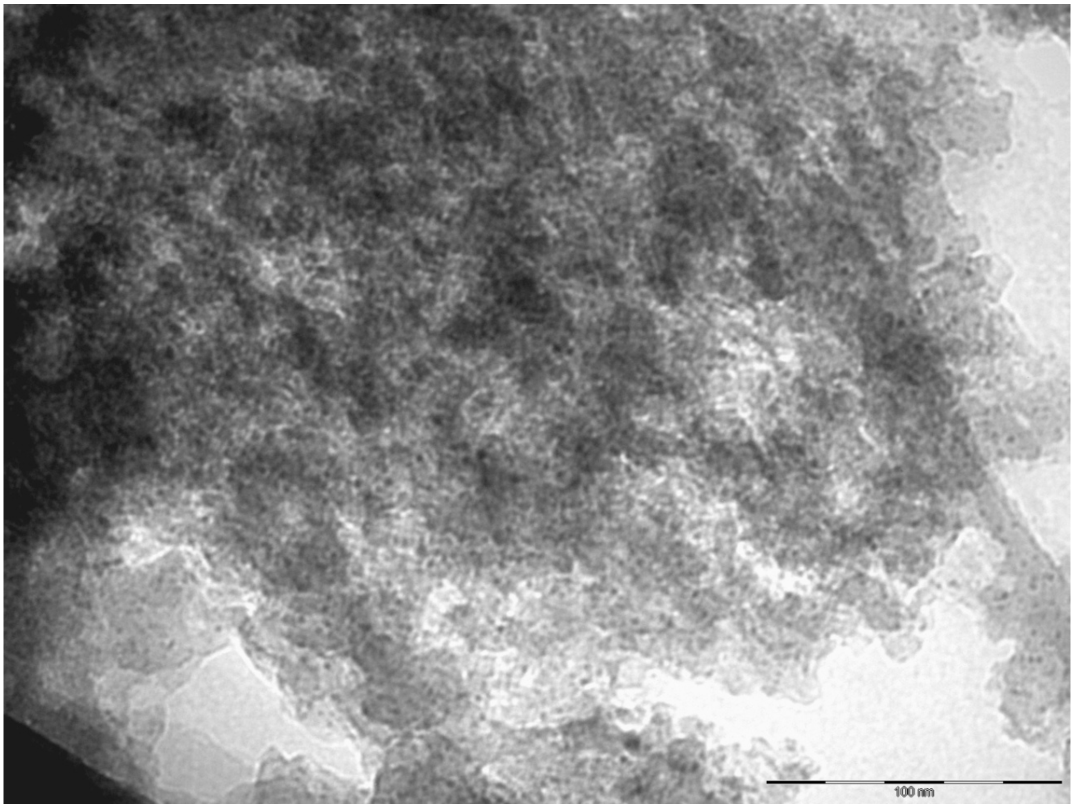


Figure S9. TEM image of Ru (5%)/C. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 2.1 ± 0.1 nm.

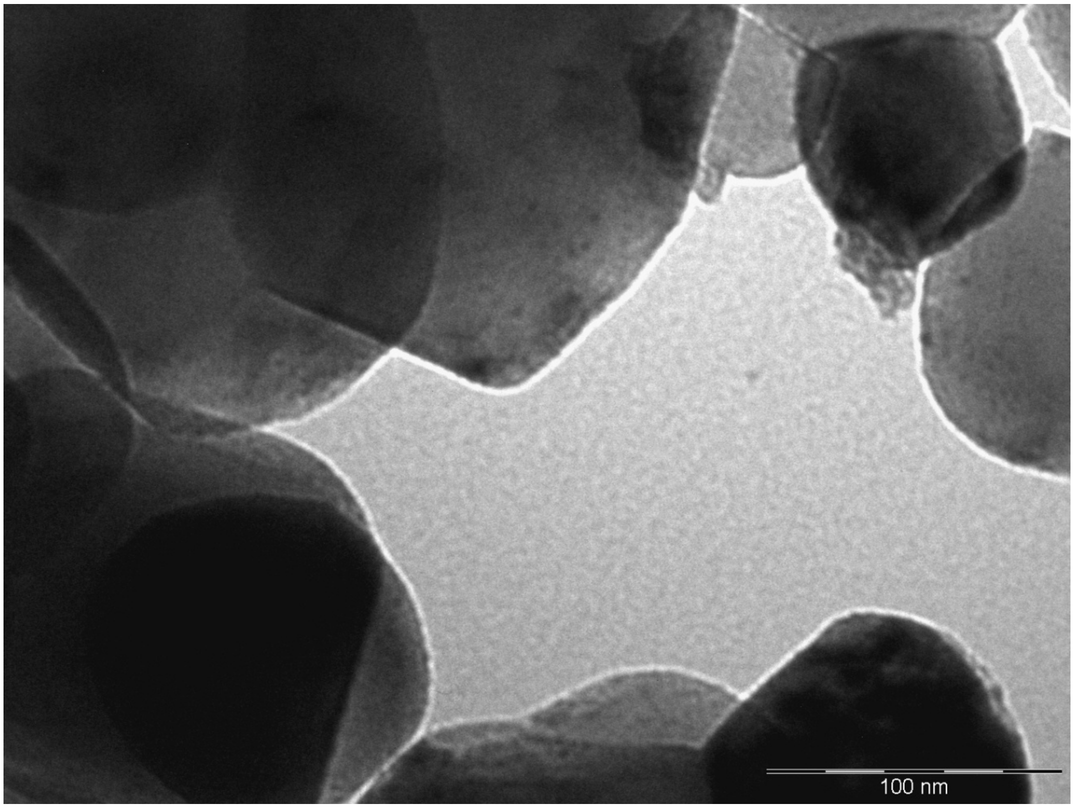


Figure S10. TEM image of Ru (5%)/TiO_2. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 5.0 ± 0.1 nm.

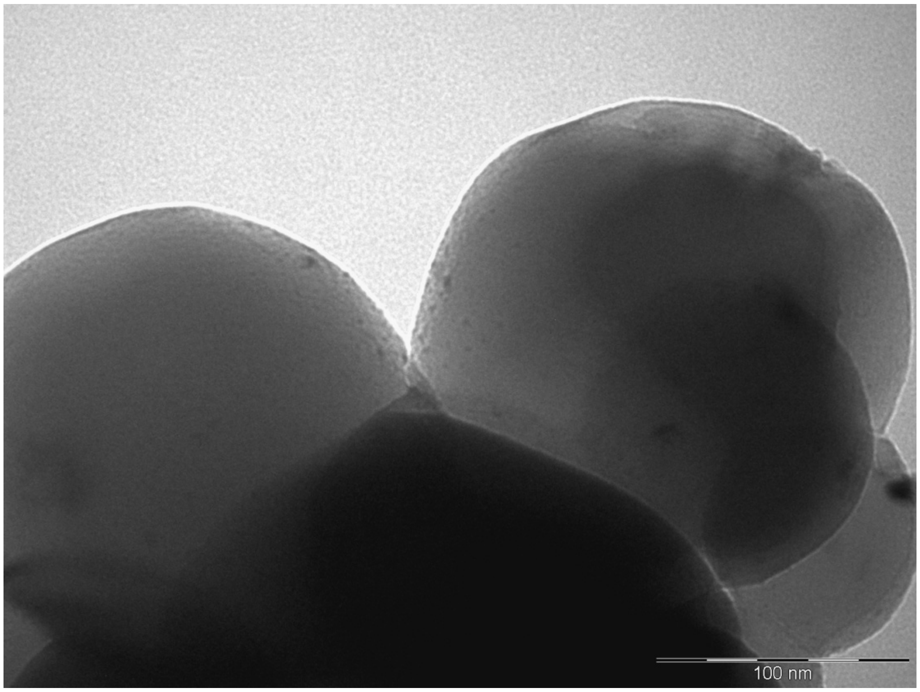


Figure S11. TEM image of Ru (0.64%)/TiO_2 after three uses of the catalyst. The average particle size of ruthenium nanoparticles determined by measured over 100 was estimated as 2.0 ± 0.1 nm.

Table S1. Metal loading (% wt) of the studied catalysts.

support	catalysts	Metal loading (% wt)
Active carbon	Ru(0.5%)/C	0.5
	Ru(1%)/C	1
	Ru(2%)/C	2
	Ru(3%)/C	3
	Ru(5%)/C	5
TiO_2	Ru(0.3%)/TiO_2	0.3
	Ru(0.6%)/TiO_2	0.6
	Ru(1%)/TiO_2	1
	Ru(5.7%)/TiO_2	5.7
CeO_2	Ru (0.5%)/CeO_2	0.5
	Ru(1%)/ CeO_2	1
	Ru(2%)/CeO_2	2
	Ru(3%)/CeO_2	3
	Ru(5%)/CeO_2	5

5) References

1. A. Corma and H. Garcia, *Chemical Society Reviews*, 2008, **37**, 2096-2126.
2. A. Abad, A. Corma and H. García, *Chemistry European Journal*, 2008, **14**, 212-222.