

Supporting Information for

**A smart strategy to fabricate Ru nanoparticle inserted porous carbon nanofibers
as highly efficient levulinic acid hydrogenation catalysts**

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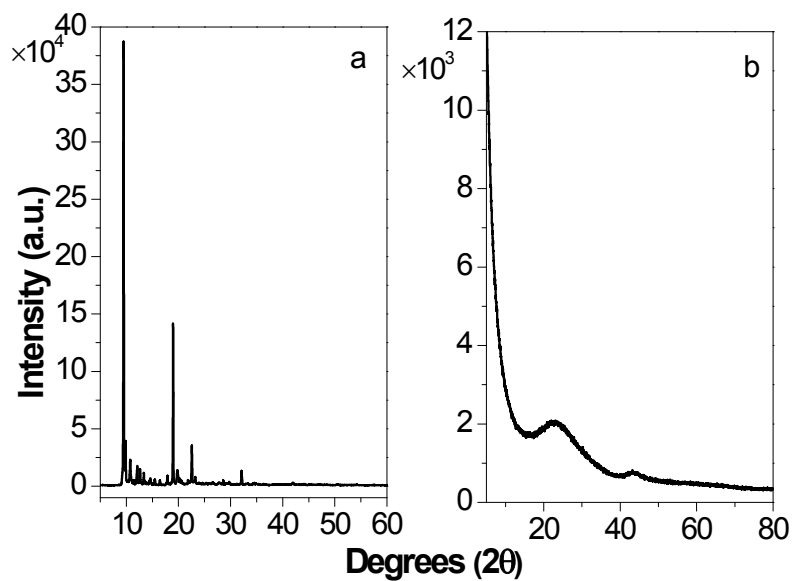


Fig. S1 X-ray diffraction patterns of (a) 0.300Ru-ZnBTC and (b) 0.300Ru-CNF.

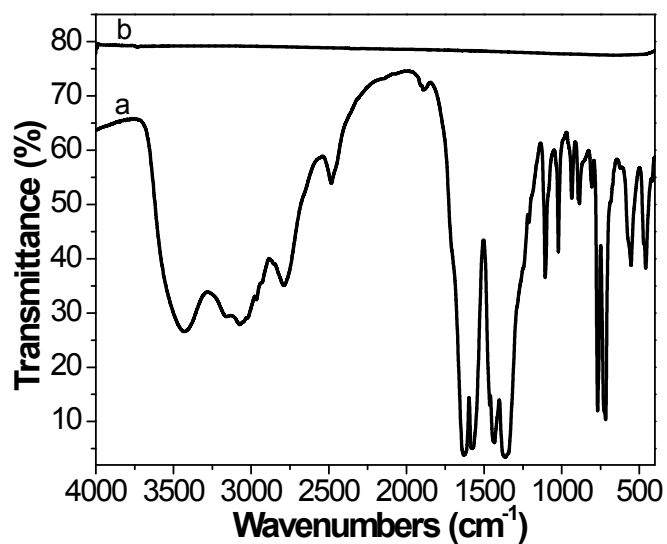


Fig. S2 FT-IR spectra of (a) 0.300Ru-ZnBTC and (b) 0.300Ru-CNF.

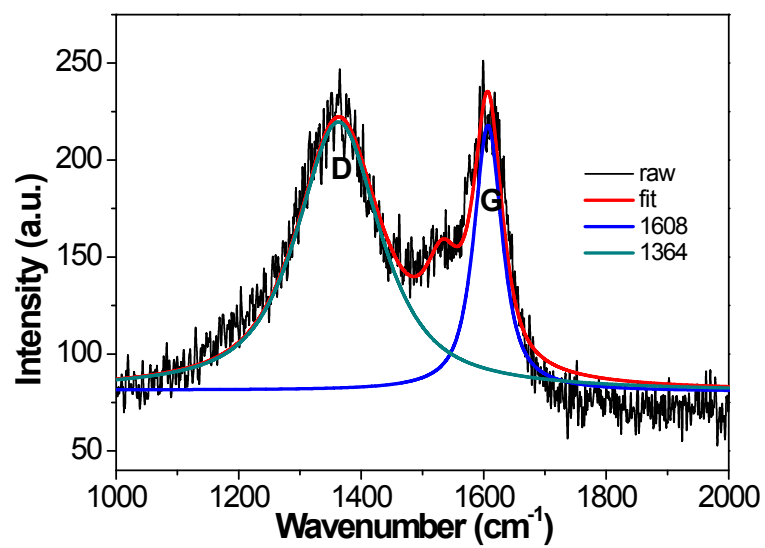


Fig. S3 Raman spectrum of 0.300Ru-CNF.

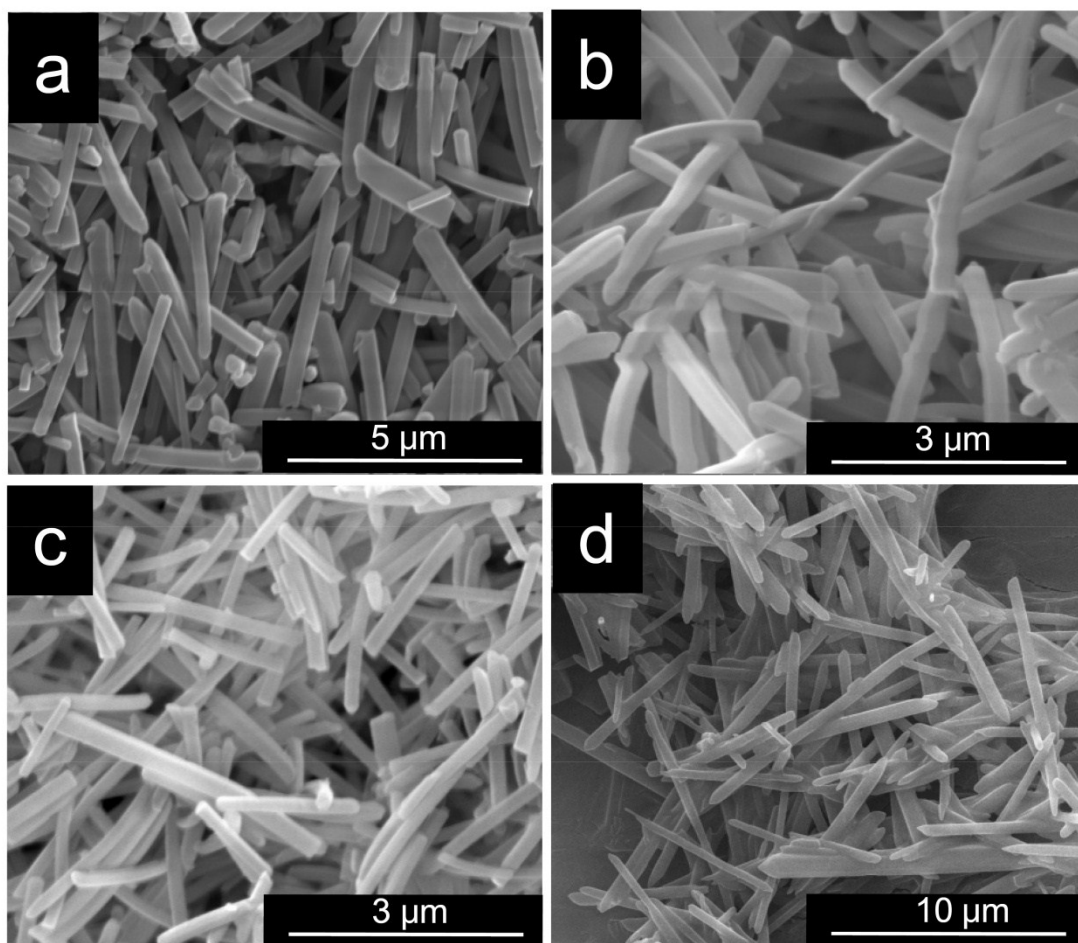


Fig. S4 SEM images of (a) 0.025Ru-CNF, (b) 0.050Ru-CNF, (c) 0.100Ru-CNF and (d) 0.500Ru-CNF.

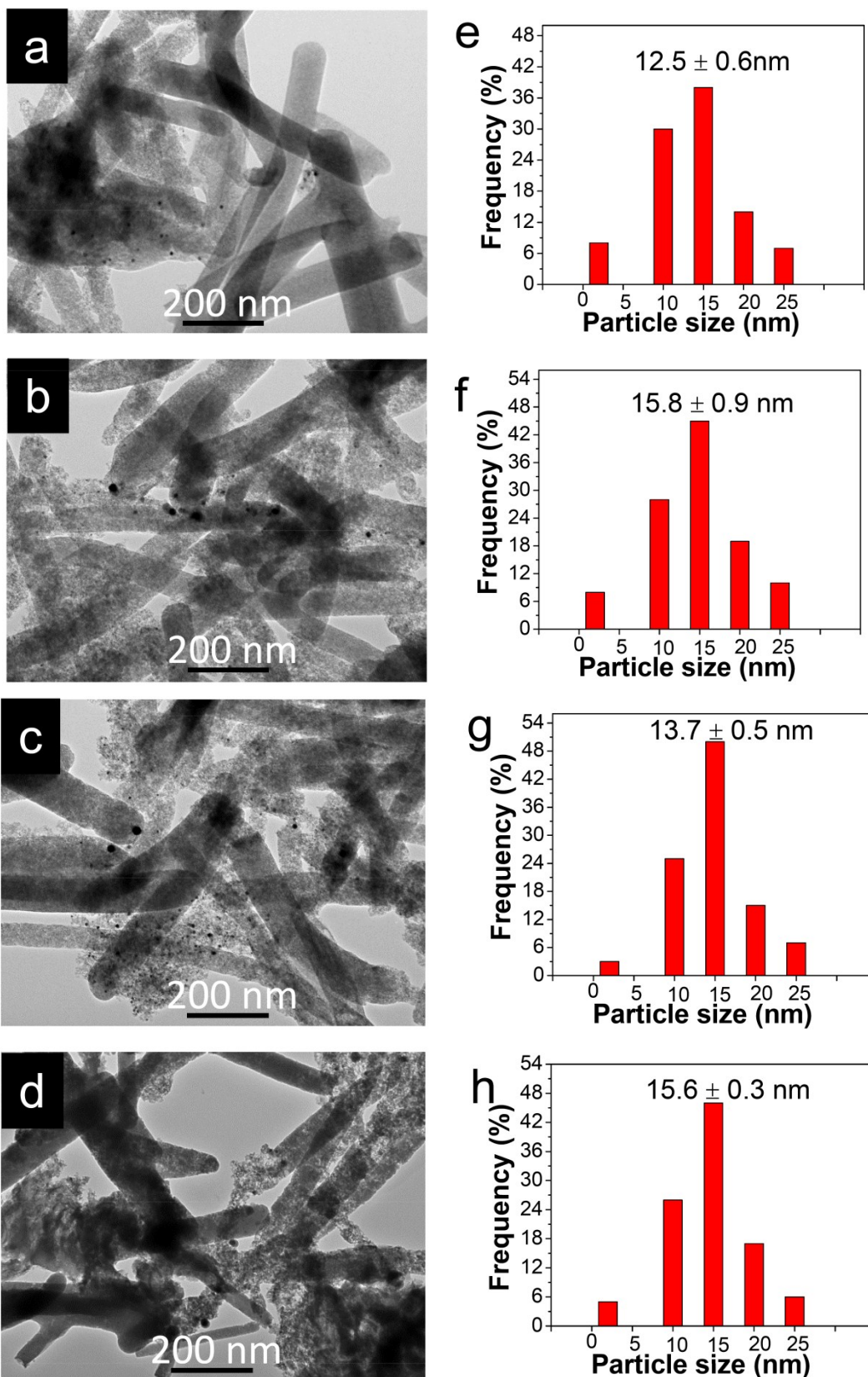


Fig. S5 TEM image and the corresponding particle size distribution for (a,e) 0.025Ru-CNF, (b,f) 0.050Ru-CNF, (c,g) 0.100Ru-CNF and (d,h) 0.500Ru-CNF.

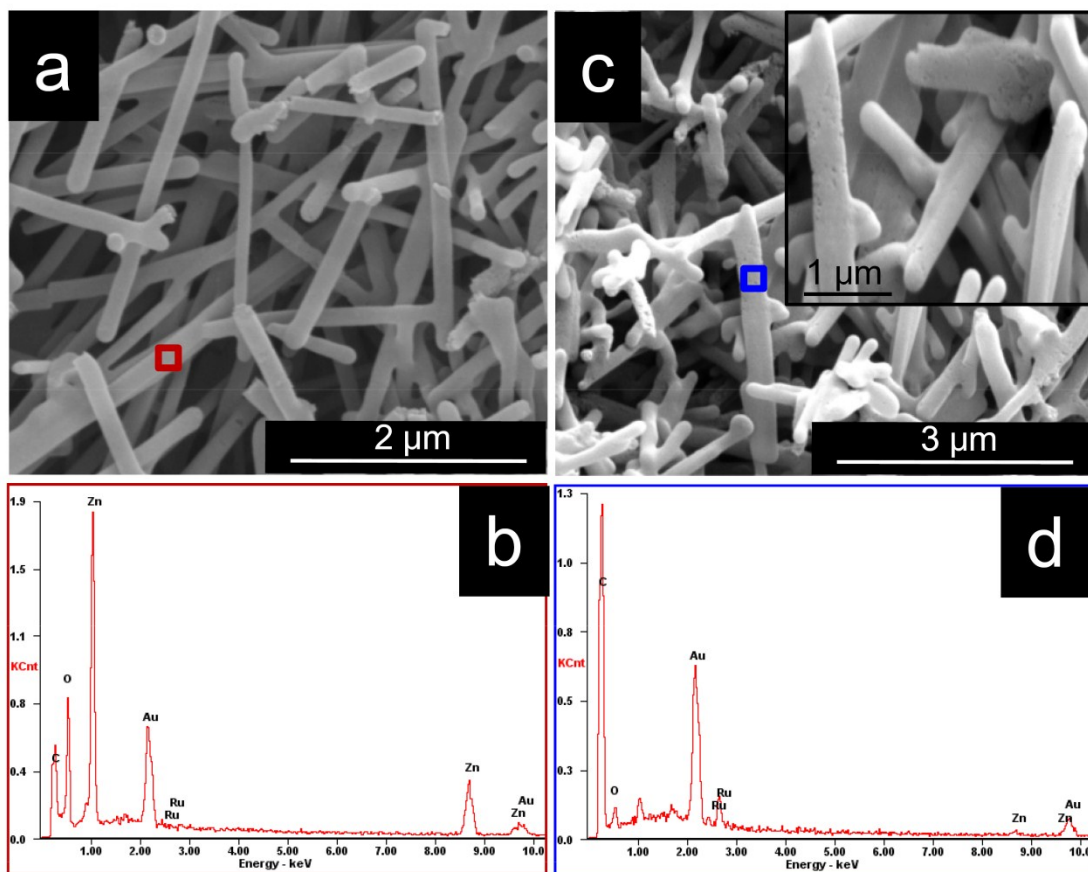


Fig. S6 (a,c) SEM image and (b,d) the corresponding EDS analysis for (a,b) 0.300Ru-ZnCNF-750 and (c,d) 0.300Ru-CNF

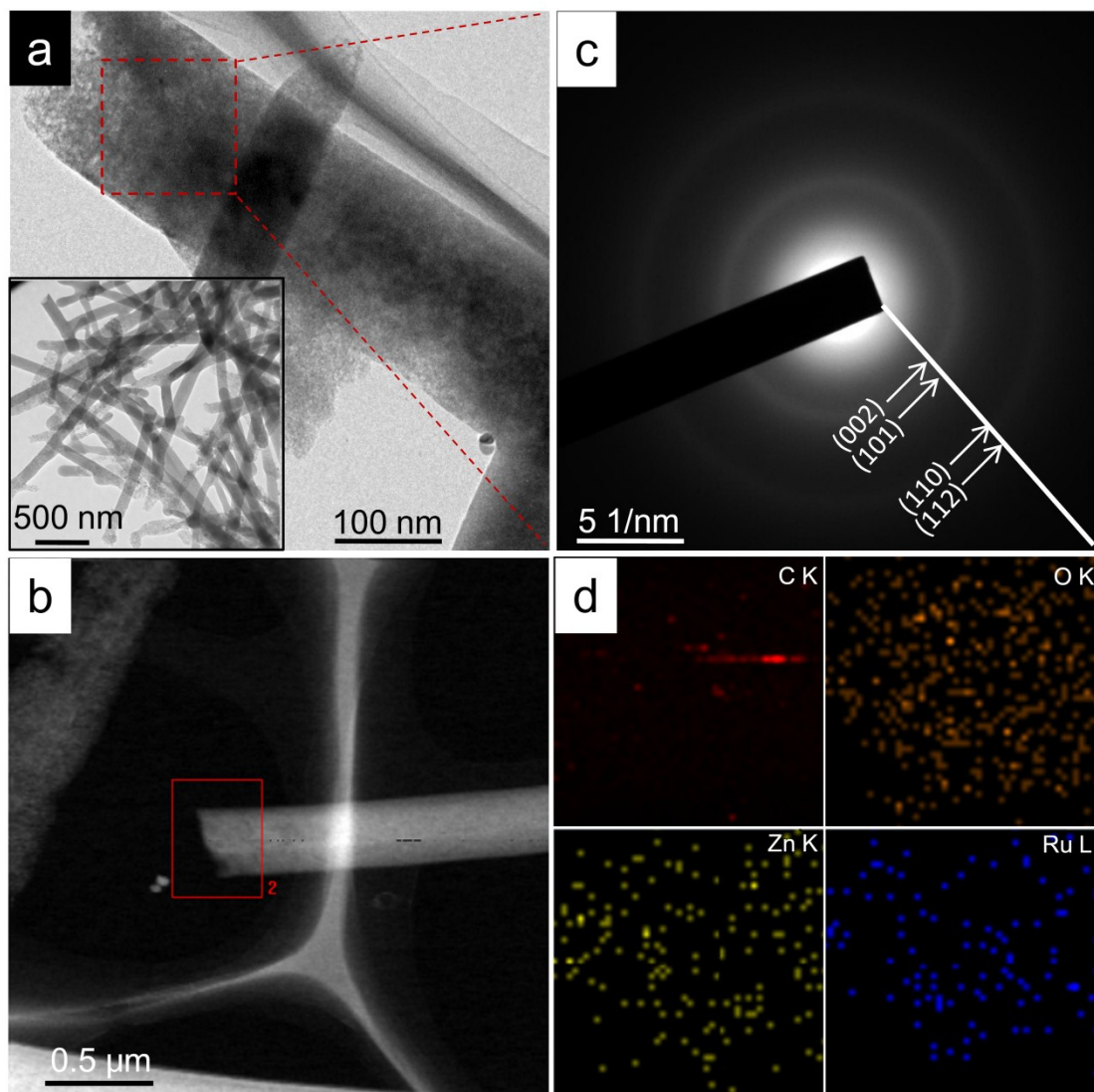


Fig. 7 (a) TEM image, (b) SAED pattern, (c) HAADF-STEM and (d) elemental maps of 0.300Ru-CNF-750.

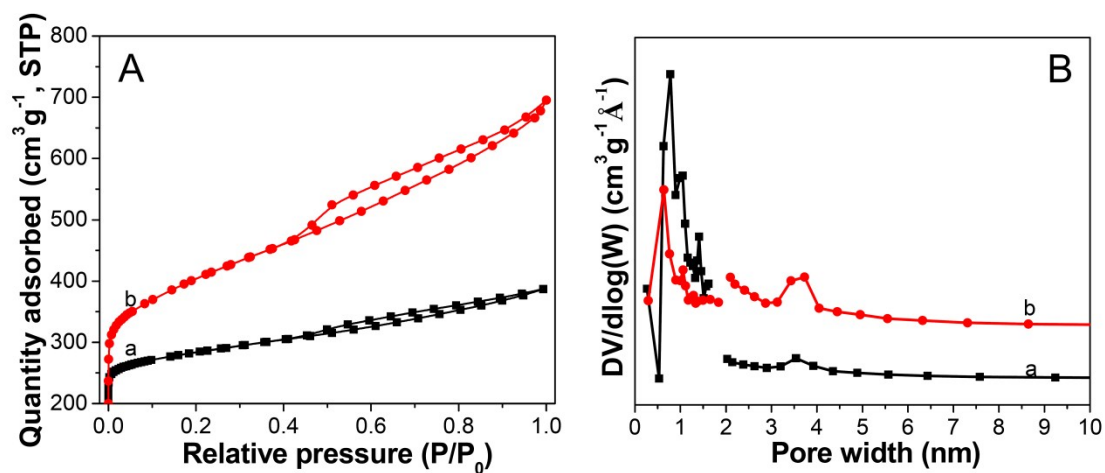


Fig. S8 (A) N₂ adsorption/desorption isotherms and (B) the corresponding pore size distribution curves of (a) 0.300Ru-ZnCNF-750 and (b) 0.300Ru-CNF-750.

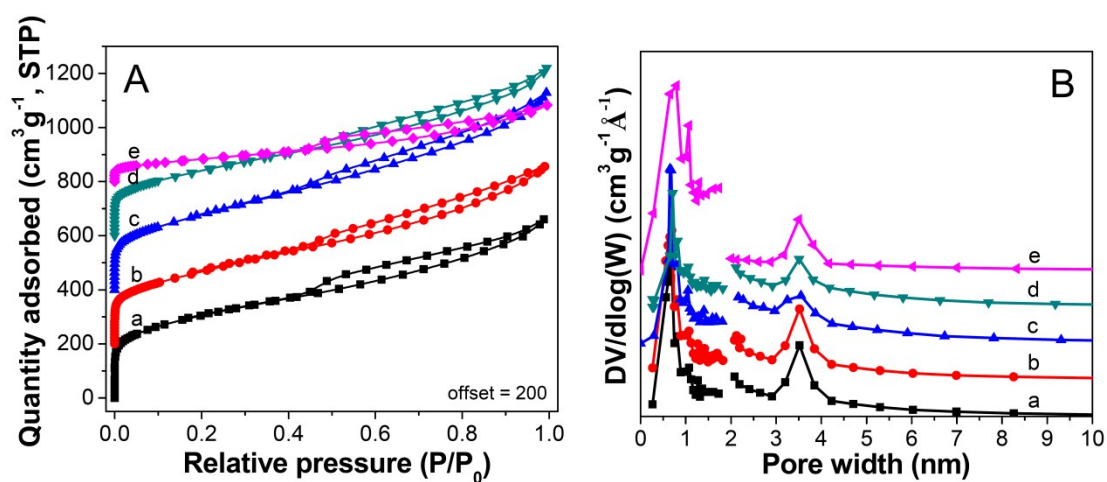


Fig. S9 (A) N₂ adsorption/desorption isotherms and (B) the corresponding pore size distribution curves of (a) 0.025Ru-CNF, (b) 0.050Ru-CNF, (c) 0.100Ru-CNF, (d) 0.500Ru-CNF and (e) 0.300Ru-CNF-p.

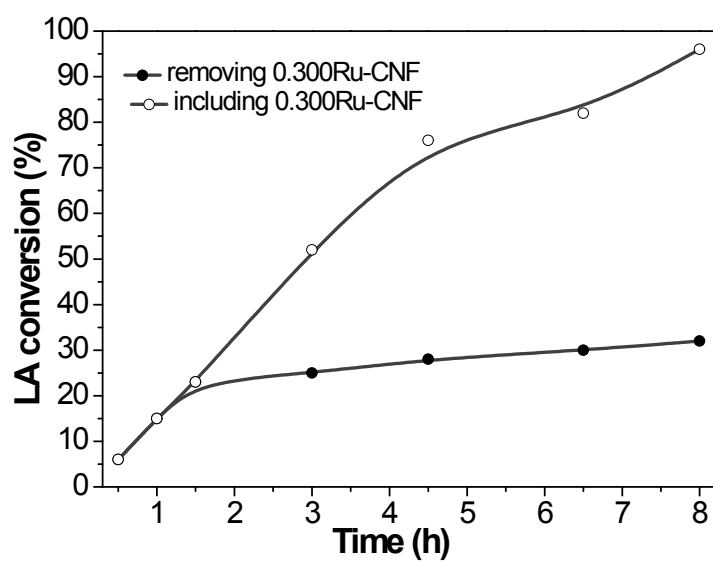


Fig. S10. Time-conversion plot of LA hydrogenation using 0.300Ru-CNF. Heterogeneous reaction check for catalyst by continuing the reaction after removing the catalyst by filtration at reaction temperature. Reaction conditions: LA 5.0 g (43 mmol), catalyst 4 wt% (200 mg), H₂ 4.5 MPa, 8 h and 150 °C.

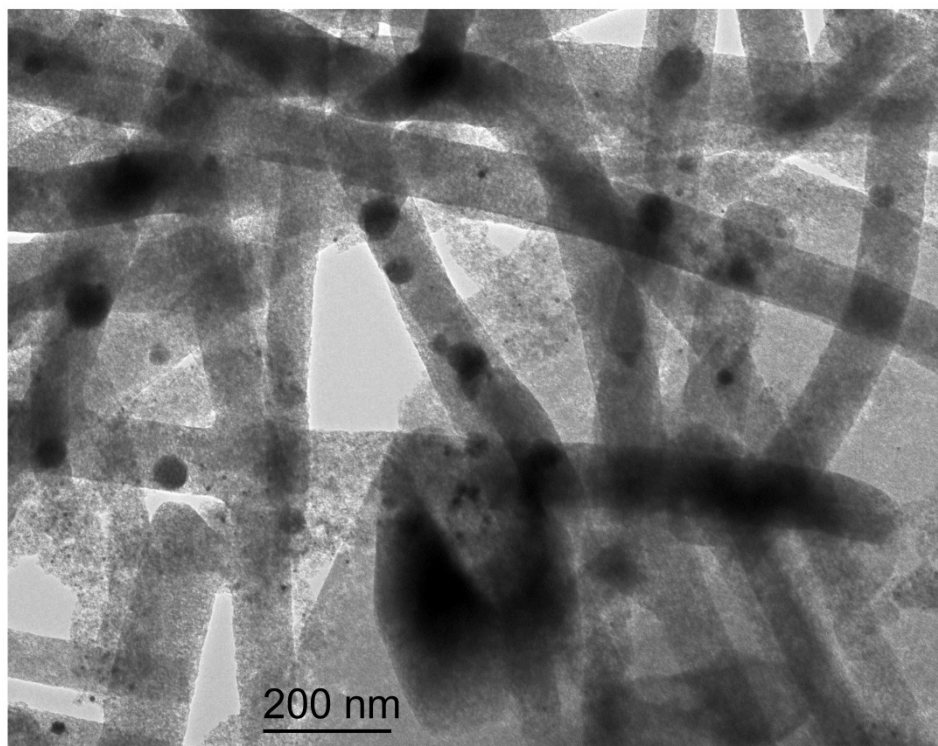


Fig. S11 TEM image of spent 0.300Ru-CNF.