**Supporting information**

# Highly efficient Fischer-Tropsch synthesis over an alumina-supported ruthenium catalyst

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**Table S1.** Metal dispersions and particle sizes of the prepared Ru/γ-$Al_2O_3$ catalysts.

| Catalyst | Dispersion (%)[a] | Particle size (nm) | |
|---|---|---|---|
| | | $H_2$ Chemisorption[b] | TEM |
| Ru/γ-$Al_2O_3$-PHR | 62 | 2.1 | 2.5 |
| Ru/γ-$Al_2O_3$-H | 83 | 1.6 | 2.1 |
| Ru/γ-$Al_2O_3$-D | 73 | 1.8 | 2.4 |

[a] measured by $H_2$ Chemisorption [1].

[b] Calculated by the following equation: particle size (nm) = 1.32/dispersion [2].

For the three catalysts, the average diameters of Ru nanoparticles calculated from the $H_2$ chemisorption results were slightly smaller than those measured by TEM.

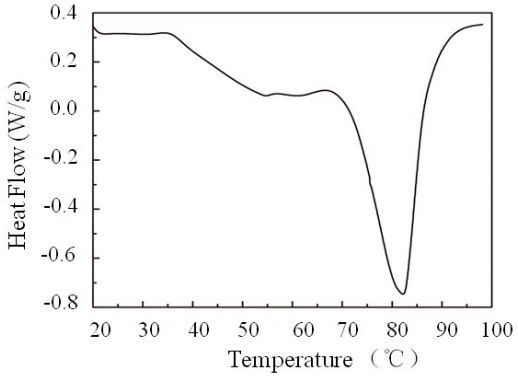


**Fig. S1.** DSC curve of the FT wax.

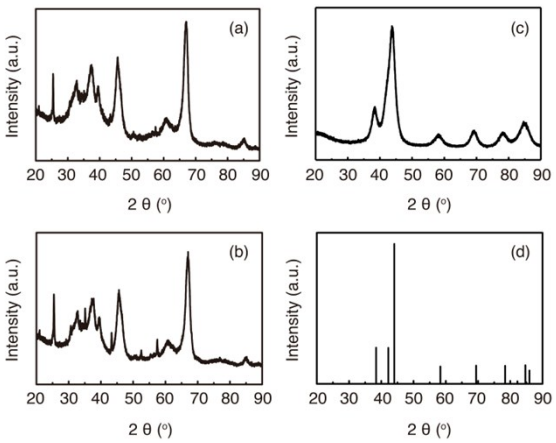


**Fig. S2.** XRD patterns of Ru/γ-$Al_2O_3$-PHR (a)， the γ-$Al_2O_3$ support (b), Ru powder prepared by the same method in the absence of a support (c), and standard diffraction signals of hcp Ru (JCPDS #65-1863) (d).

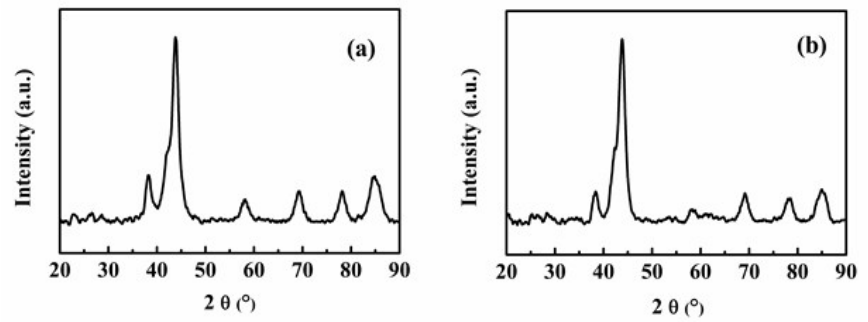


**Fig. S3.** XRD patterns of Ru powders prepared by reducing $RuO_2 \cdot xH_2O$ with $H_2$ in cyclohexane (a) and in anhydrous atmosphere (b).

## References

[1] K. C. Taylor, *J. Catal.,* 1975, **38**, 299.

[2] J. Álvarez-Rodríguez, A. Guerrero-Ruiz, I. Rodríguez-Ramos, A. Arcoya-Martín, *Catal. Today*., 2005, **107**, 302-309.