Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Supplementary information for

Mechanistic insight into selective hydrogenolysis of sorbitol to propylene glycol and ethylene glycol on supported Ru catalysts

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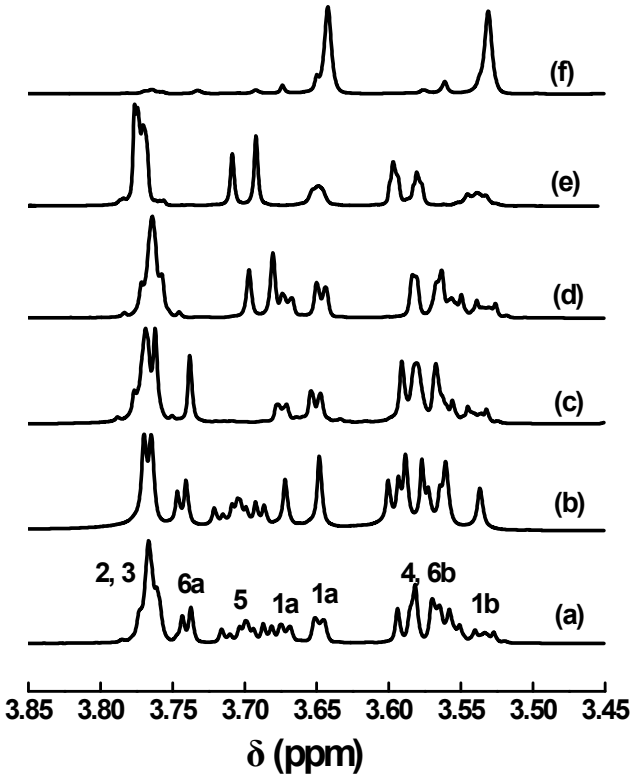

Fig. S1 ^{1}H NMR spectra of different D-sorbitol molecules in D_2O at room temperature.

(a) D-sorbitol; (b) D-sorbitol-2-d_1; (c) D-sorbitol-5-d_1; (d) D-sorbitol-6,6-d_2; (e) D-sorbitol-1,6,6-d_3; (f) D-sorbitol-1,2,3,4,5,6,6-d_7. All H atoms at different C positions are labeled in the spectrum of D-sorbitol (a). For D-sorbitol-1,2,3,4,5,6,6-d_7, its H atoms at C-1 position was substituted by deuterium equally at C(1)-H_a and C(1)-H_b positions.

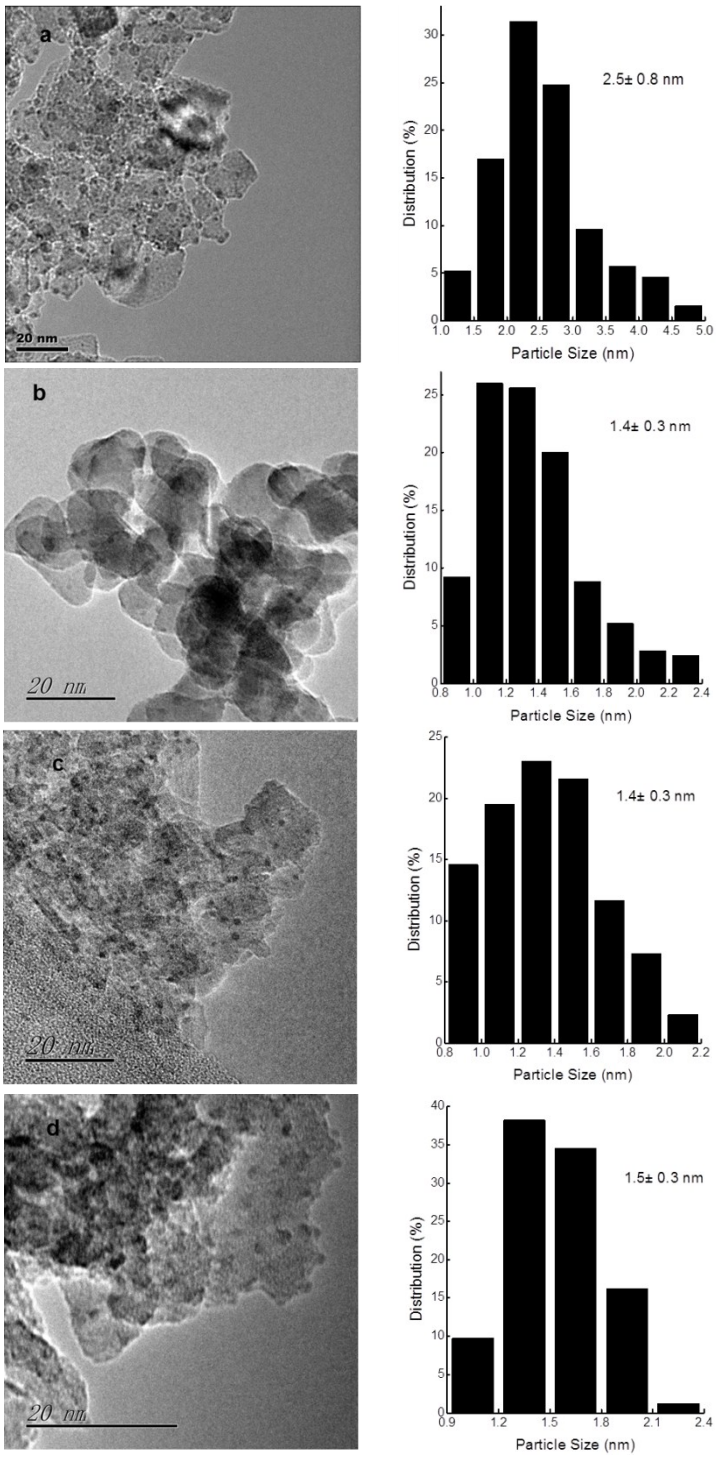

Fig. S2 TEM micrographs and histograms of Ru particle size distribution for different Ru catalysts (scale bar=20 nm). (a) Ru/MgO, 2.5 ± 0.8 nm; (b) Ru/m-ZrO_2, 1.4 ± 0.3 nm; (c) Ru/Al_2O_3, 1.4 ± 0.3 nm; (d) Ru/TiO_2, 1.5 ± 0.3 nm.

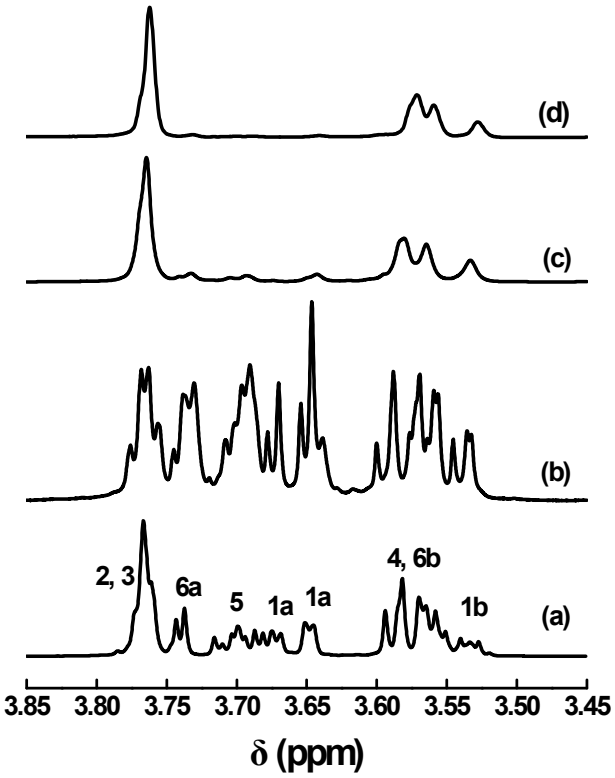

Fig. S3 ^{1}H NMR spectra of different D-sorbitol molecules in D_2O at room temperature.

(a) D-sorbitol; (b) The sorbitol molecules separated from the solution of D-sorbitol-1,2,3,4,5,6,6-d_7 hydrogenolysis in H_2O and H_2; (c) The sorbitol molecules separated from the solution of D-sorbitol hydrogenolysis in D_2O and H_2; (d) The sorbitol molecules separated from the solution of D-sorbitol hydrogenolysis in D_2O and D_2. All H atoms at different C positions are labeled in the spectrum of D-sorbitol (a).

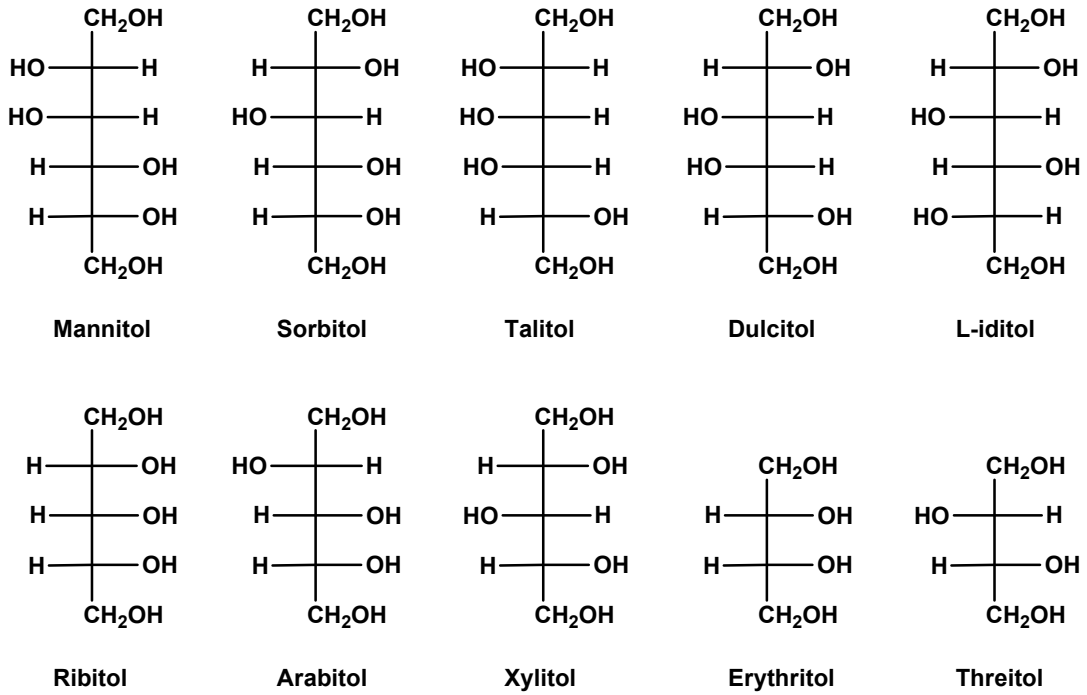

Fig. S4 Fischer projections of hexitols, pentitols and tetritols

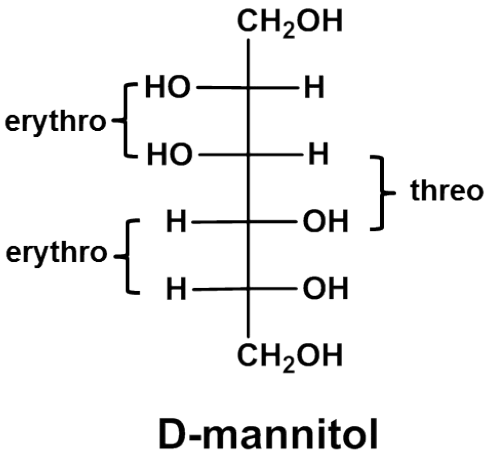

Fig. S5 Erythro and threo sequences of hydroxyl groups of D-mannitol.