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Electronic supplementary information (ESI) for the manuscript:

Self-metathesis of 1-butene to propene over SBA-15-supported WO_3

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- **Scheme S3.** Pathway for formation of propylaldehyde and W=CH_2 species over WO_3-SBA-15-700.

Table S1. H_2-TPR quantitative analysis results of WO_3-containing catalysts.

Samples	Peak position(°C)	H_2 uptake (μmol/g)	Theoretical H_2 uptake (μmol/g)[a]	Reduction degree
WO_3/SBA-15	730,773	800.5	2566.9	31.19%
WO_3/SBA-15-700	648, 721, 781	1291.4	2506.5	52.52%
WO_3-SBA-15-700	457, 609, 732	453.9	2390.7	18.99%

[a]Theoretical H_2 uptake was determined as the quantity of H_2 required for the total reduction of WO_3 in the catalysts to W^0.

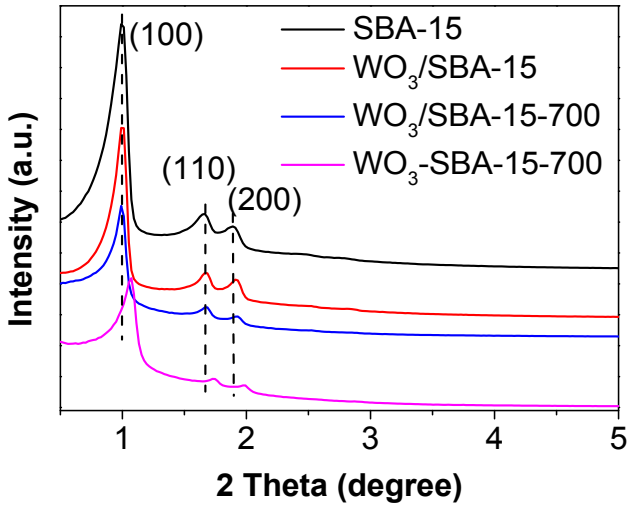


Fig. S1. Small-angle XRD patterns of SBA-15, WO_3/SBA-15, WO_3/SBA-15-700 and WO_3-SBA-15-700.

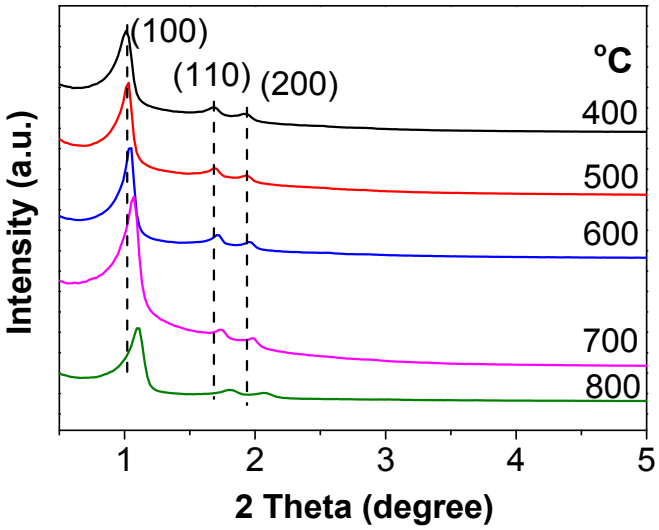


Fig. S2. Small-angle XRD patterns of WO_3-SBA-15-x (x represents the calcination temperature, ^oC).

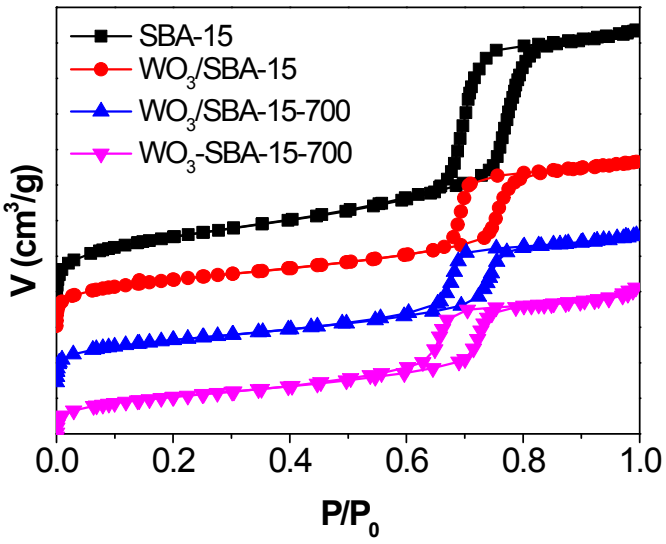


Fig. S3. N_2 adsorption/desorption isotherms of SBA-15, WO_3/SBA-15, WO_3/SBA-15-700 and WO_3-SBA-15-700.

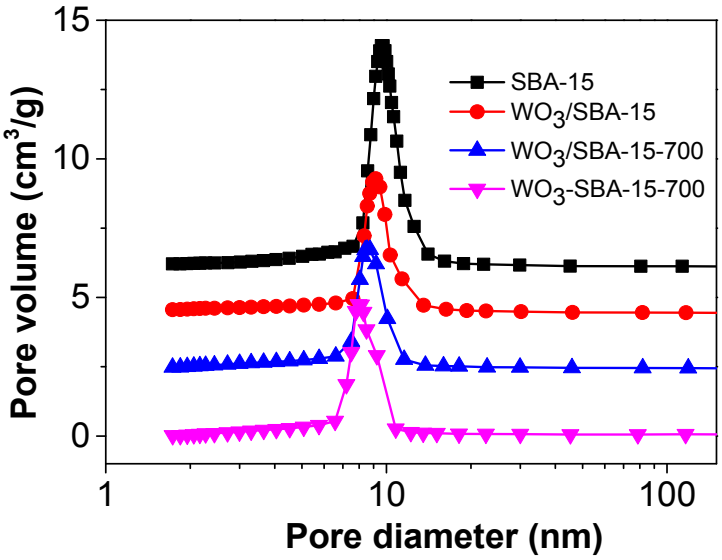


Fig. S4. Pore size distribution of SBA-15, WO_3/SBA-15, WO_3/SBA-15-700 and WO_3-SBA-15-700.

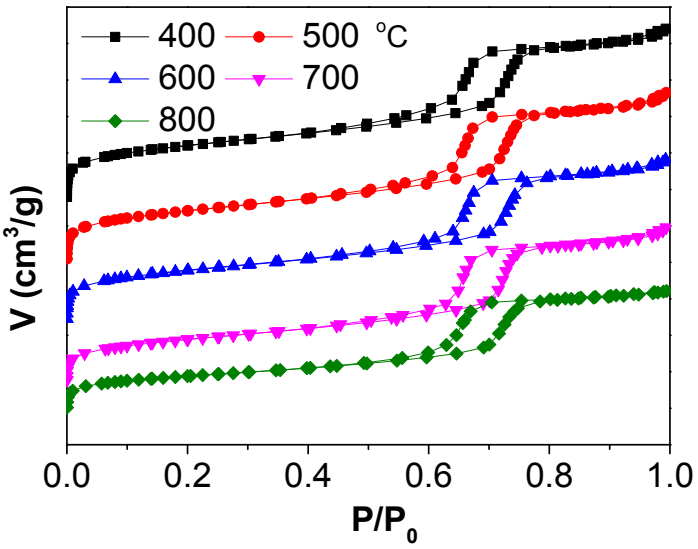


Fig. S5. N_2 adsorption/desorption isotherms of WO_3-SBA-15-x (x represents the calcination temperature, °C).

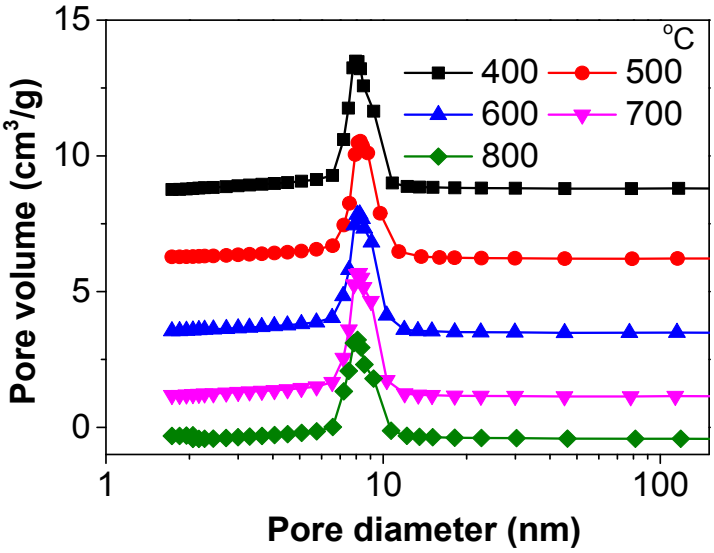


Fig. S6. Pore size distributions of WO_3-SBA-15-x (x represents the calcination temperature, °C).

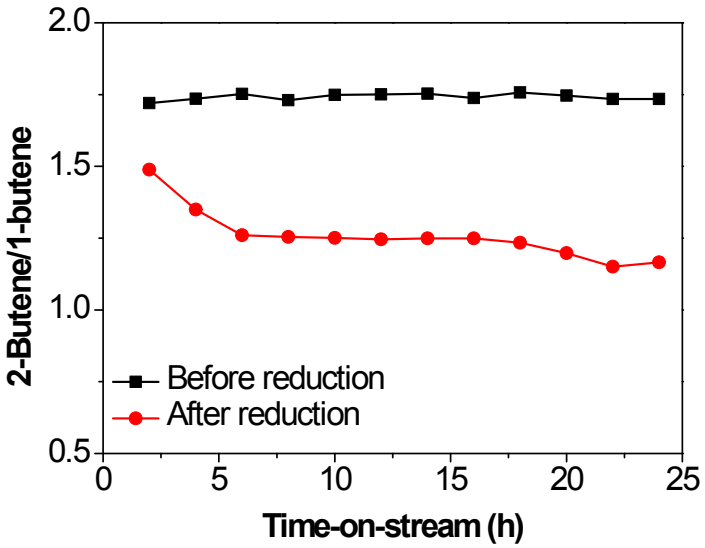


Fig. S7. 2-Butene/1-butene ratios obtained at different reaction time over WO_3-SBA-15-700 (■) and its reduced counterpart in H_2 at 550 °C for 3 h (●) (reaction conditions: 350 °C, 0.1 MPa, WHSV=1 h^{-1}).

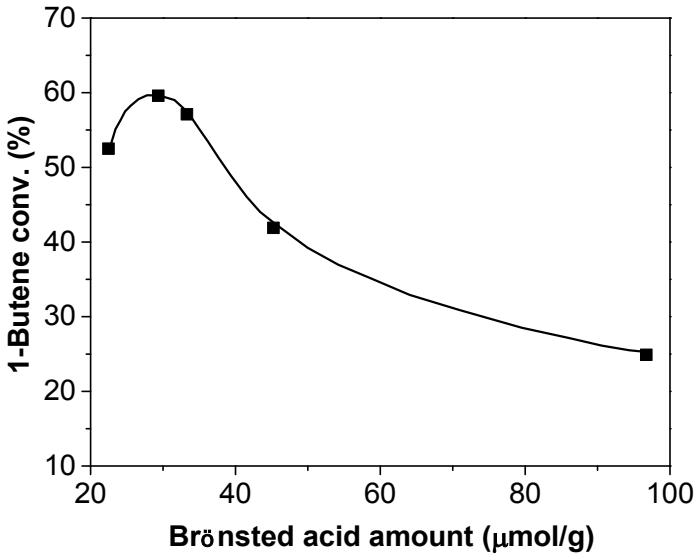
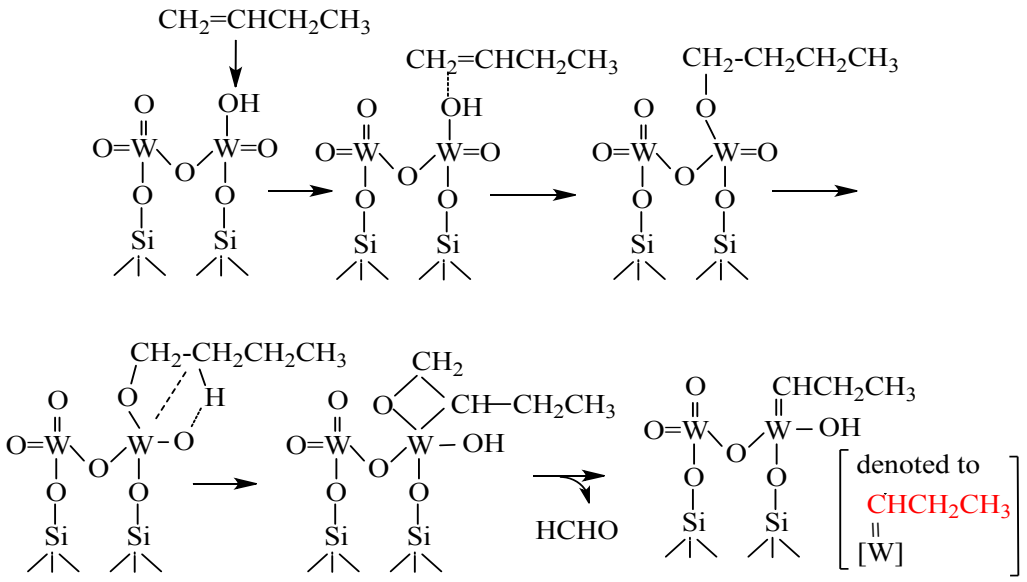
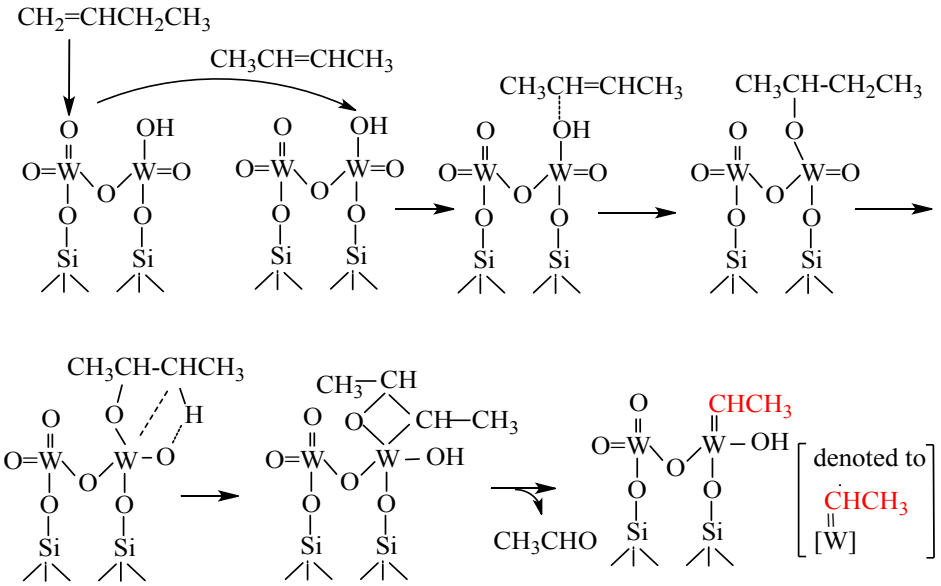


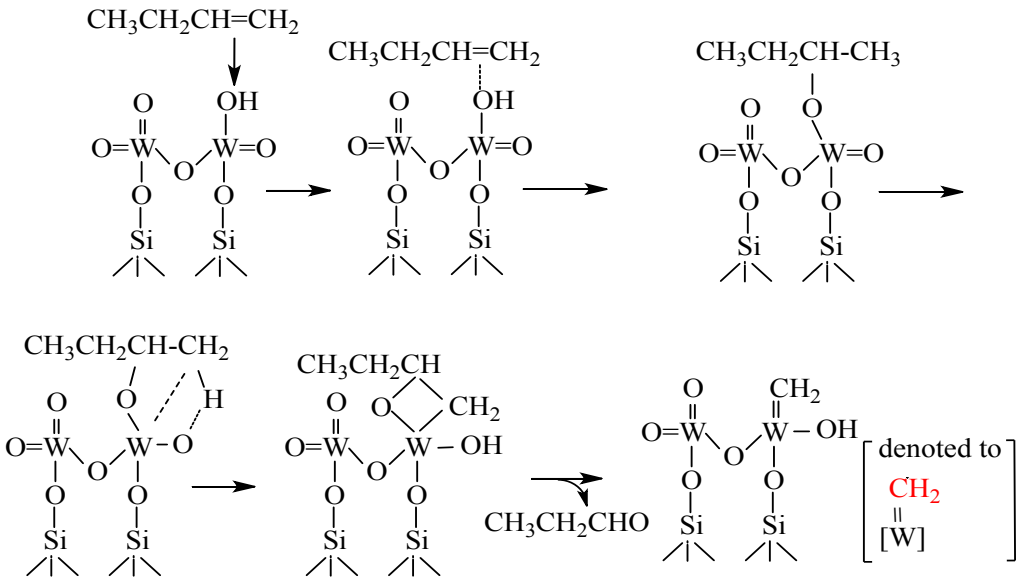
Fig. S8. Relationships between 1-butene conversion and Brönsted acid amount of WO_3-SBA-15-x samples.



Scheme S1. Pathway for formation of formaldehyde and W=CHCH$_2$CH$_3$ species over WO$_3$-SBA-15-700.



Scheme S2. Pathway for formation of acetaldehyde and W=CHCH$_3$ species over WO$_3$-SBA-15-700.



Scheme S3. Pathway for formation of propylaldehyde and W=CH_2 species over WO_3-SBA-15-700.