Electronic supplementary information (ESI) for the manuscript:

Effect of tungsten surface density of WO_x-ZrO_2 on its catalytic performance in hydrogenolysis of cellulose to ethylene glycol

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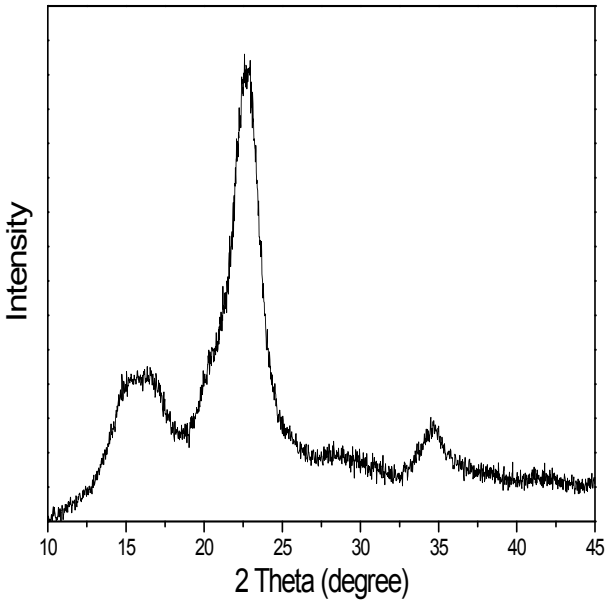


Fig. S1 XRD pattern of microcrystalline cellulose**.**

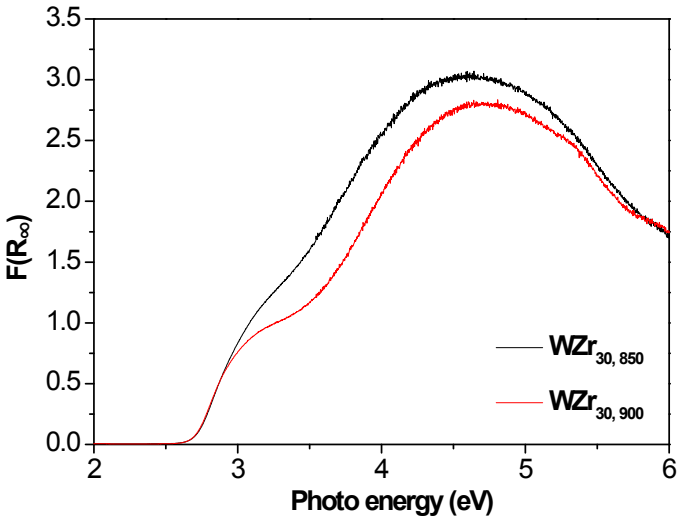


Fig. S2 DR UV-Vis spectra of $WZr_{30,\ 850}$ and $WZr_{30,\ 900}$.

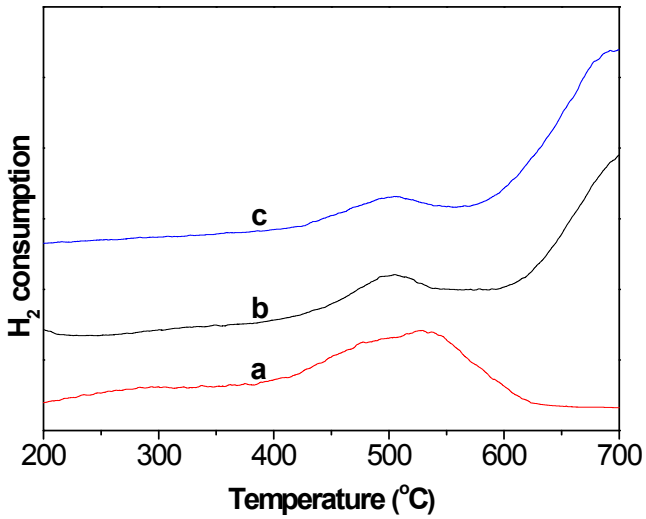


Fig. S3 H_2-TPR profile of (a) $WZr_{30,\ 850}$ combined with Ru/C (b) $WZr_{30,\ 850}$ (c) $WZr_{30,\ 900}$

The more intense reduction peak of the $WZr_{30,\ 850}$ combined with Ru/C than those of $WZr_{30,\ 850}$ and $WZr_{30,\ 900}$ reveals that Ru/C promotes the reduction of WO_3 to W^{5+} species.

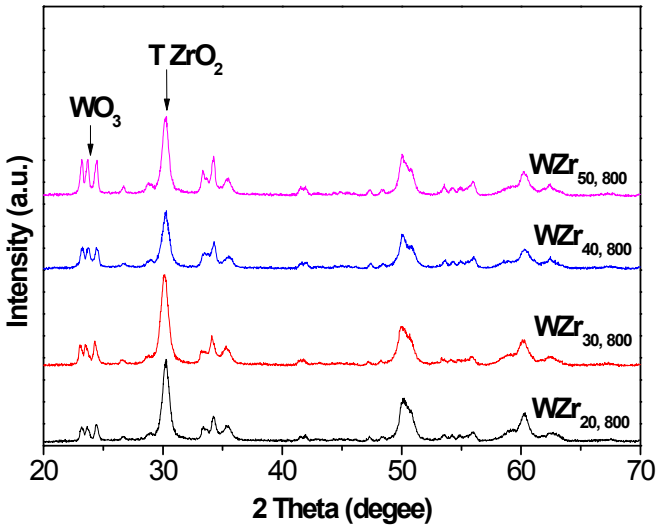
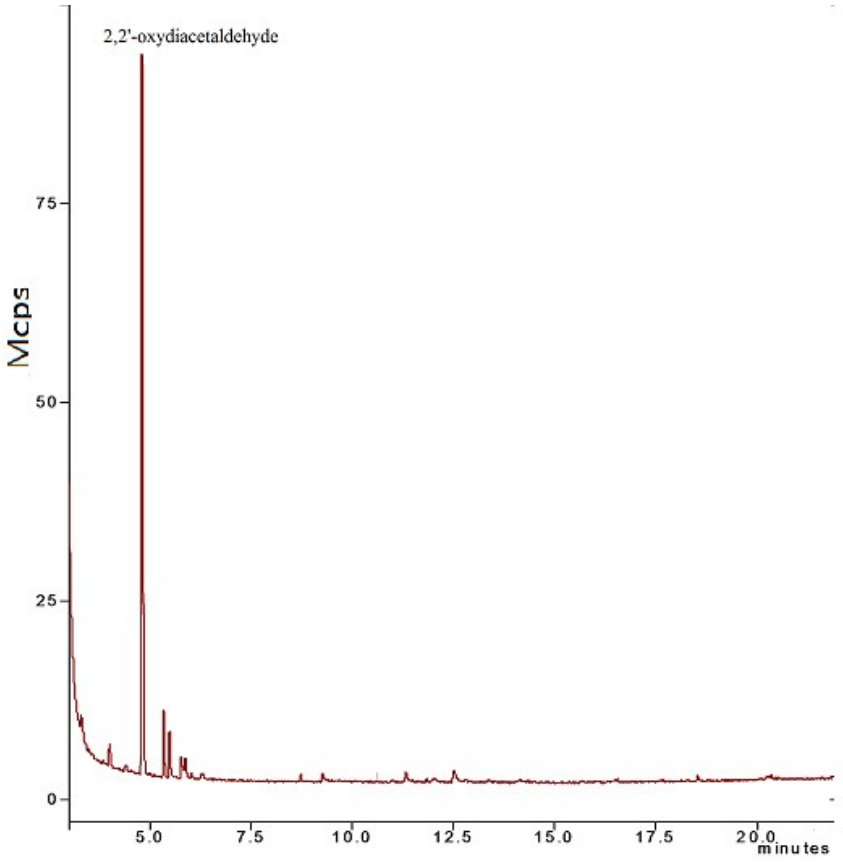


Fig. S4 XRD patterns of $WZr_{x,\ 800}$ with different tungsten loading.


2,2'-oxydiacetaldehyde
Mcps
75
50
25
0
5.0
7.5
10.0
12.5
15.0
17.5
20.0
minutes

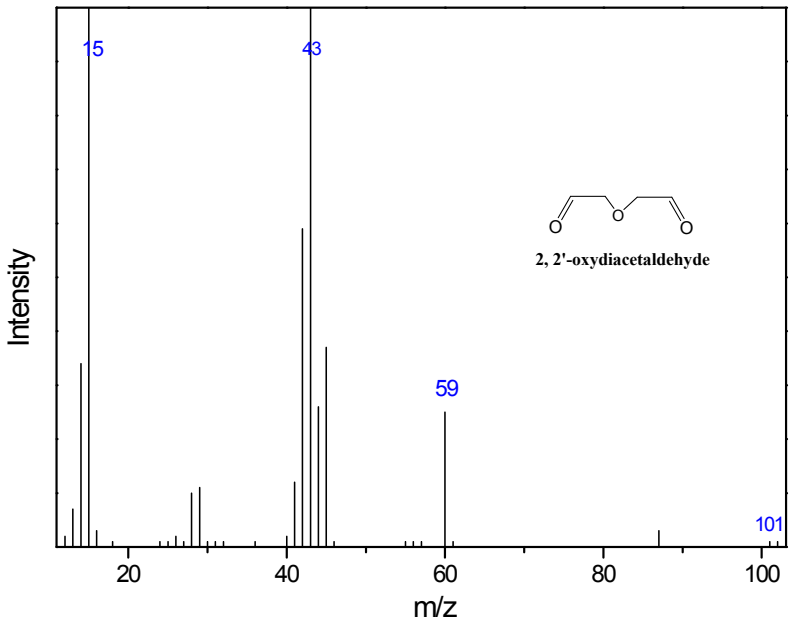

15
43
59
101
Intensity
20
40
60
80
100
m/z
2, 2'-oxydiacetaldehyde

Fig. S5 GC-MS analysis of the 2,2'-oxydiacetaldehyde

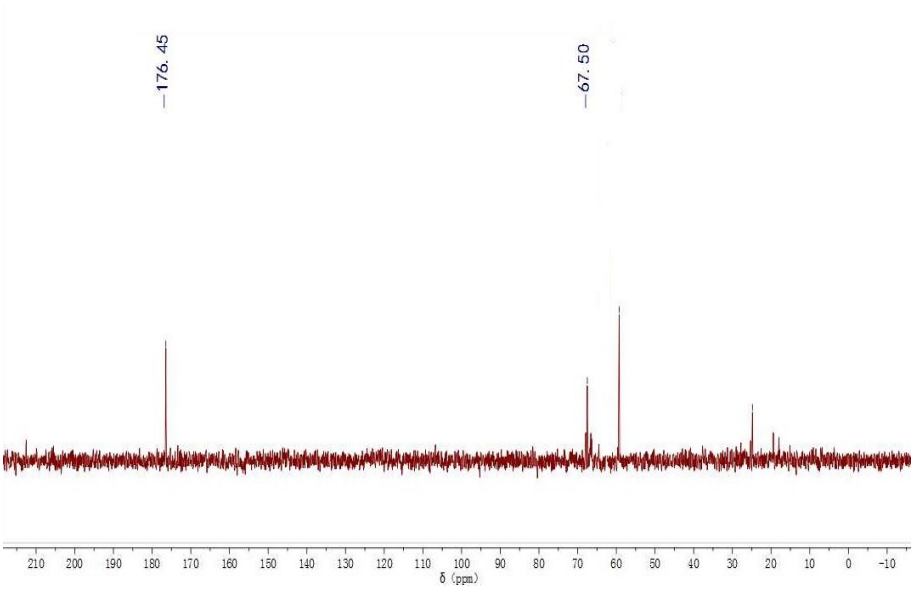


Fig. S6 ^{13}C NMR spectrum of the products at the reaction of 0.5 h.

The 176.45 ppm peak can be attributed to the aldehyde carbon of 2,2'-oxydiacetaldehyde, and the 67.50 ppm peak can be attributed to the methylene carbon of 2,2'-oxydiacetaldehyde.

Table S1 BET surface area and tungsten surface density of $WZr_{x,\ 800}$.

Samples	$WZr_{20,\ 800}$	$WZr_{30,\ 800}$	$WZr_{40,\ 800}$	$WZr_{50,\ 800}$
BET (m^2/g)	49.2	41.7	36.3	25.6
Tungsten surface density (W/nm^2)	10.6	18.9	28.7	51.8