

## Electronic Supplementary Information (ESI)

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### Hydrogenolysis of glycerol in aqueous medium over Pt/WO<sub>3</sub>/zirconium phosphate catalysts studied by <sup>1</sup>H NMR spectroscopy

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- T1** Catalytic activity data calculation sheet for hydrogenolysis of glycerol over 1Pt-8WO<sub>3</sub>/ZrP
- F1** XRD profiles of ZrP, 8WO<sub>3</sub>/ZrP, 2Pt/ZrP and 2Pt/8WO<sub>3</sub>/ZrP. The prominent peaks due to  $\gamma$ -WO<sub>3</sub> (\*) and metallic Pt (#) are marked.
- F2** Nitrogen adsorption-desorption isotherms of (a) 2Pt/ZrP, and (b) 2Pt/8WO<sub>3</sub>/ZrP.
- T2** N<sub>2</sub> physisorption data of ZrP samples.

**T1.** Representative catalytic activity data calculation sheet for hydrogenolysis of glycerol over 1Pt-8WO<sub>3</sub>/ZrP using <sup>1</sup>H NMR spectral data (Reaction conditions: Glycerol = 0.1 g, water = 3 g, catalyst = 0.1 g, hydrogen pressure = 40 bar, reaction temperature = 200 °C and reaction time = 12 h. 1,2-PDO = 1,2-propanediol, 1,3-PDO = 1,3-propanediol, 1-PO = 1-propanol and 2-PO = 2-propanol)

The following equations are used in the calculation:

$$\begin{aligned} & \text{Distribution of component Xi (mol \%)} \\ & = \frac{\text{Area of the peak of Xi (normalized to one proton)}}{\sum_{i=1}^n \text{Area of peak of Xi (normalized to one proton)}} \times 100 \end{aligned}$$

$$\begin{aligned} & \text{Glycerol conversion (mol \%)} \\ & = 100 - \text{Percentage distribution of glycerol in the reaction mixture} \end{aligned}$$

$$\text{Selectivity of component Xi (mol \%)} = \frac{\text{Percentage distribution of Xi in the product}}{\text{Percentage glycerol conversion}} \times 100$$

Turnover frequency (TOF) = moles of glycerol converted per mole of nominal Pt per hour

Component	<sup>1</sup> H NMR peak position (ppm)	<sup>1</sup> H NMR Peak multiplicity	Number of equivalent protons	<sup>1</sup> H NMR peak integrated area	Peak area for one equivalent proton	Component distribution (mol%)
Glycerol	3.65-3.77	Multiplet	1H (H <sub>c</sub> )	0.01	0.01	7.69
1,3-PDO	1.68-1.72	Multiplet	2H (H <sub>b</sub> )	0.05	0.025	19.23
1,2-PDO	1.04-1.05	Doublet	3H (H <sub>d</sub> )	0.09	0.03	23.08
1-PO	0.79-0.82	Triplet	3H (H <sub>d</sub> )	0.17	0.056	43.58
2-PO	1.08-1.09	Doublet	6H (H <sub>a</sub> )	0.05	0.0083	6.41

$$\text{Glycerol conversion (mol\%)} = 100 - 7.69 = 92.30$$

Product selectivity (mol%):

$$1,3\text{-PDO selectivity (mol\%)} = (19.23/92.30) \times 100 = 20.83$$

$$1,2\text{-PDO selectivity (mol\%)} = (23.08/92.30) \times 100 = 25.0$$

$$1\text{-PO selectivity (mol\%)} = (43.58 / 92.30) \times 100 = 47.22$$

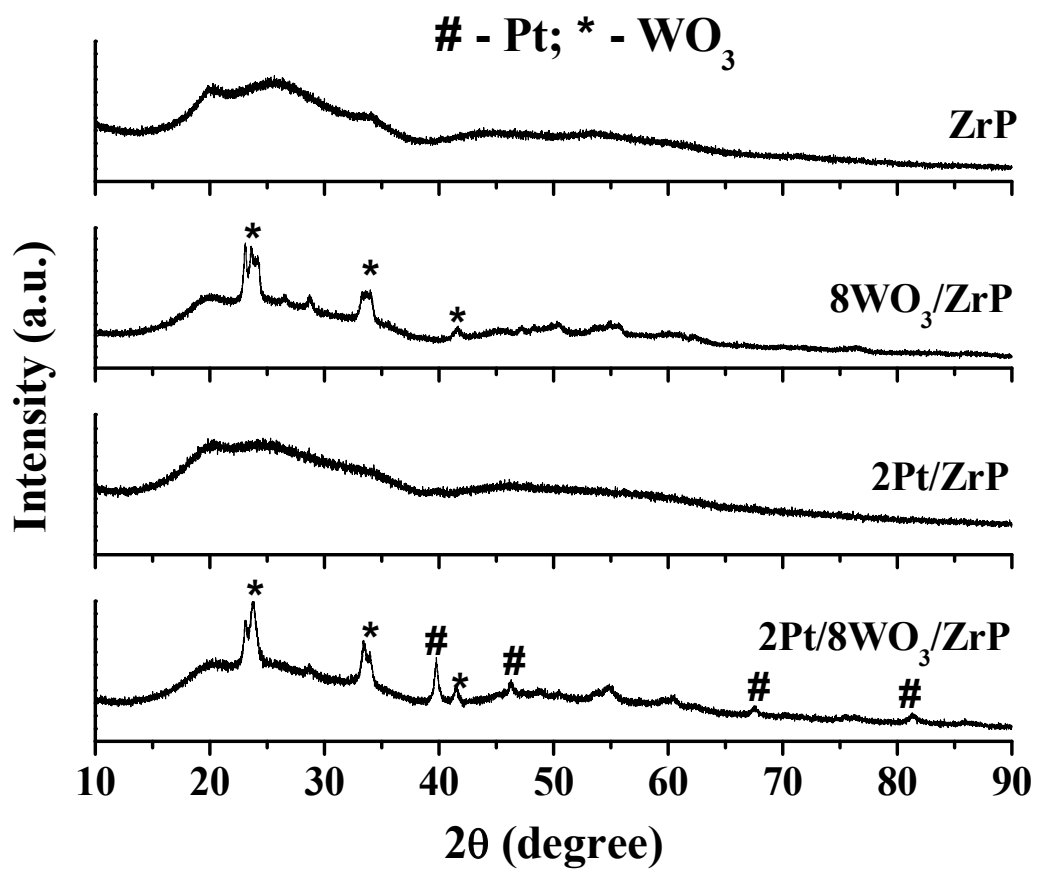
$$2\text{-PO selectivity (mol\%)} = (6.41/92.3) \times 100 = 6.94$$

$$1,3\text{-PDO}/1,2\text{-PDO molar ratio} = 20.83 / 25.0 = 0.83$$

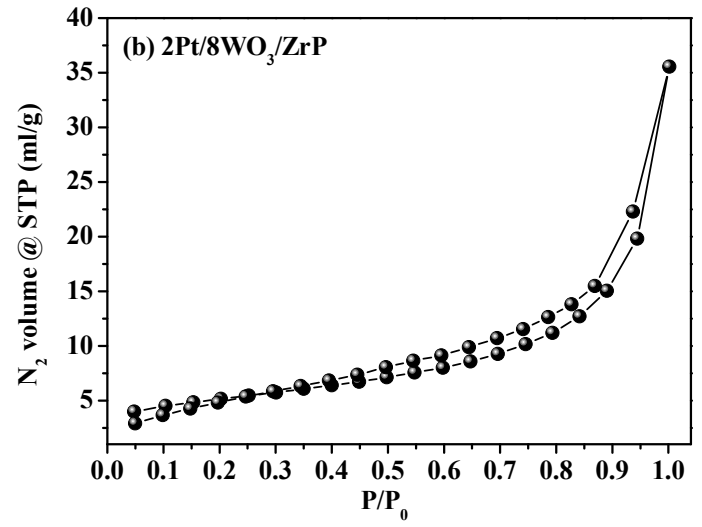
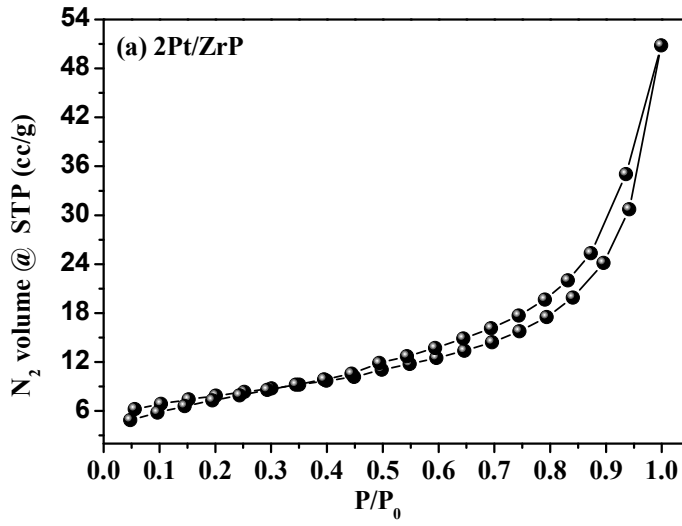
$$\text{Moles of glycerol converted} = (0.1 \times 92.3) / (100 \times 92.09382) = 0.001$$

$$\text{Moles of nominal Pt in the catalyst} = (0.1 \times 1) / (100 \times 195.084) = 0.00000513$$

$$\text{TOF (h}^{-1}\text{)} = 0.001 / (0.00000513 \times 12) = 16.2$$



**F1.** XRD profiles of ZrP, 8WO<sub>3</sub>/ZrP, 2Pt/ZrP and 2Pt/8WO<sub>3</sub>/ZrP. The prominent peaks due to  $\gamma$ -WO<sub>3</sub> (\*) and metallic Pt (#) are marked.



**F2.** Nitrogen adsorption-desorption isotherms of (a) 2Pt/ZrP, and (b) 2Pt/8WO<sub>3</sub>/ZrP.

**T2.** N<sub>2</sub> physisorption data of ZrP samples

Catalyst	S <sub>BET</sub> (m <sup>2</sup> /g)	Total pore volume (ml/g)	Average pore radius (nm)
ZrP	13	0.04	2.1
8WO <sub>3</sub> /ZrP	21	0.06	2.1
1Pt/ZrP	28	0.10	1.7
2Pt/ZrP	27	0.08	1.9
1Pt/4WO <sub>3</sub> /ZrP	29	0.08	1.7
1Pt/8WO <sub>3</sub> /ZrP	18	0.06	1.9
1Pt/12WO <sub>3</sub> /ZrP	19	0.07	1.7
2Pt/8WO <sub>3</sub> /ZrP	18	0.06	1.9