

# Supplementary Material: Hydrogenolysis of Glycerol to 1,2-Propanediol and Ethylene Glycol over Ru-Co/ZrO<sub>2</sub> Catalysts

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**Table S1.** Catalytic performance of the prepared catalysts in glycerol hydrogenolysis.

Catalyst	Conversion (%)	Selectivity (%)							LCB (%)
		1,2-PDO	EG	1-PO	2-PO	1,3-PDO	EO	MO	
ZrO <sub>2</sub>	<1.0	-	-	-	-	-	-	-	-
Ru/ZrO <sub>2</sub>	67.5	41.1	29.8	11.8	4.7	2.6	5.9	4.1	18.2
Ru-Co/ZrO <sub>2</sub>	56.2	70.3	18.0	6.7	2.2	0.2	1.5	1.1	10.7
Co/ZrO <sub>2</sub>	22.7	83.2	7.3	3.1	1.4	-	2.8	2.2	4.1

This is the full list of product selectivity corresponding to Table 1. 1,2-PDO: 1,2-propanediol, EG: ethylene glycol, 1-PO: 1-propanol, 2-PO: 2-propanol, 1,3-PDO: 1,3-propanediol, EO: ethanol, MO: methanol; LCB: loss of carbon balance.

**Table S2.** Effect of calcination temperature on the catalytic performance of Ru-Co/ZrO<sub>2</sub>.

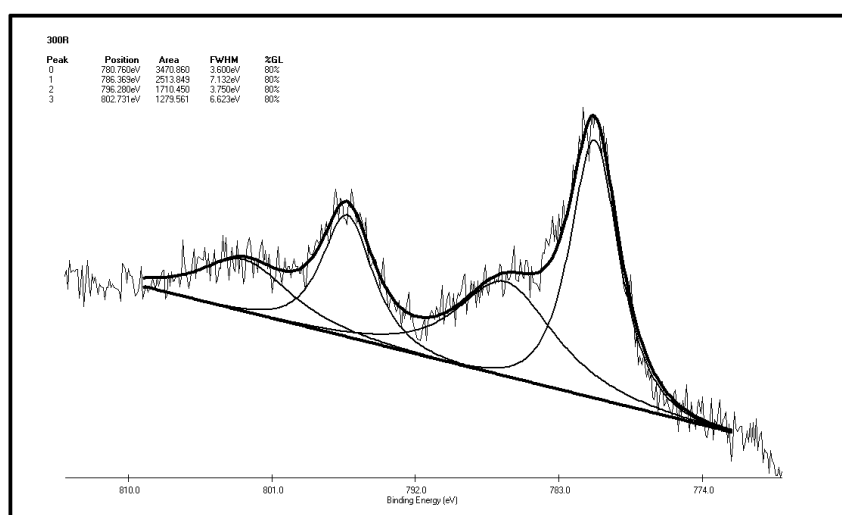
Calcination Temperature (°C)	Conversion (%)	Selectivity (%)							LCB (%)
		1,2-PDO	EG	1-PO	2-PO	1,3-PDO	EO	MO	
250	58.7	64.8	24.4	4.9	2.0	0.8	1.9	1.2	15.0
350	56.2	70.3	18.0	6.7	2.2	0.2	1.5	1.1	10.7
450	43.5	68.9	15.3	8.8	3.1	0.5	2.6	0.8	7.9
550	29.1	71.8	16.9	5.4	1.8	1.2	1.9	1.0	5.2

This is the full list of product selectivity corresponding to Table 3.

**Table S3.** Effect of reduction temperature on the catalytic performance of Ru-Co/ZrO<sub>2</sub>.

Reduction Temperature (°C)	Conversion (%)	Selectivity (%)							LCB (%)
		1,2-PDO	EG	1-PO	2-PO	1,3-PDO	EO	MO	
Unreduced	43.0	62.2	26.7	4.5	1.7	0.9	2.7	1.3	5.9
250	56.2	70.3	18.0	6.7	2.2	0.2	1.5	1.1	10.7
300	42.6	71.8	16.5	6.1	1.0	0.7	2.5	1.4	8.4
400	28.7	74.0	10.3	4.3	1.2	1.4	5.9	2.9	5.5
500	14.8	78.5	11.6	2.7	0.9	1.8	3.1	1.4	3.8

This is the full list of product selectivity corresponding to Table 4.



**Figure S1.** Co 2p XPS spectrum of Ru-Co/ZrO<sub>2</sub> reduced at 300 °C.

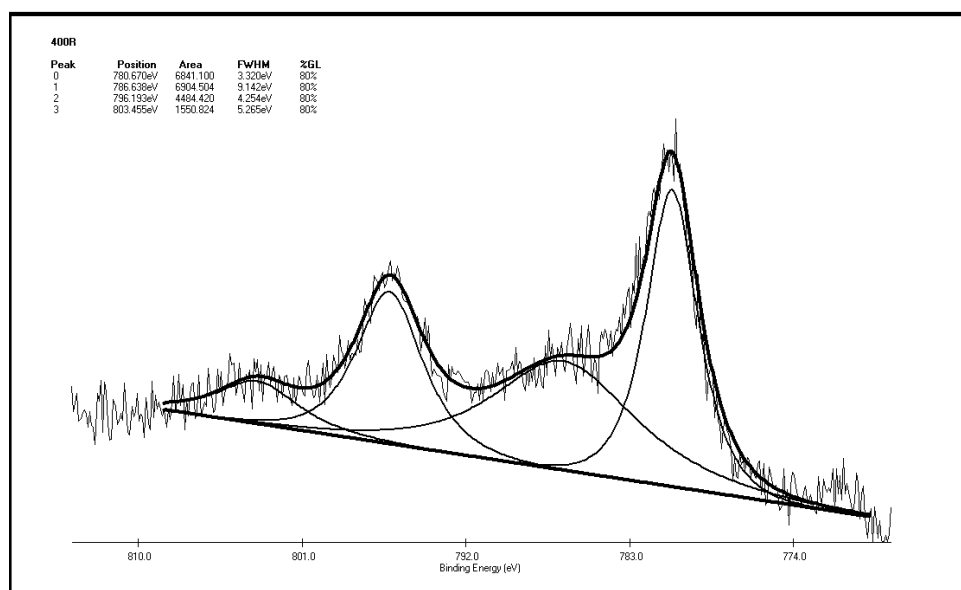


Figure S2. Co 2p XPS spectrum of Ru-Co/ZrO<sub>2</sub> reduced at 400 °C.

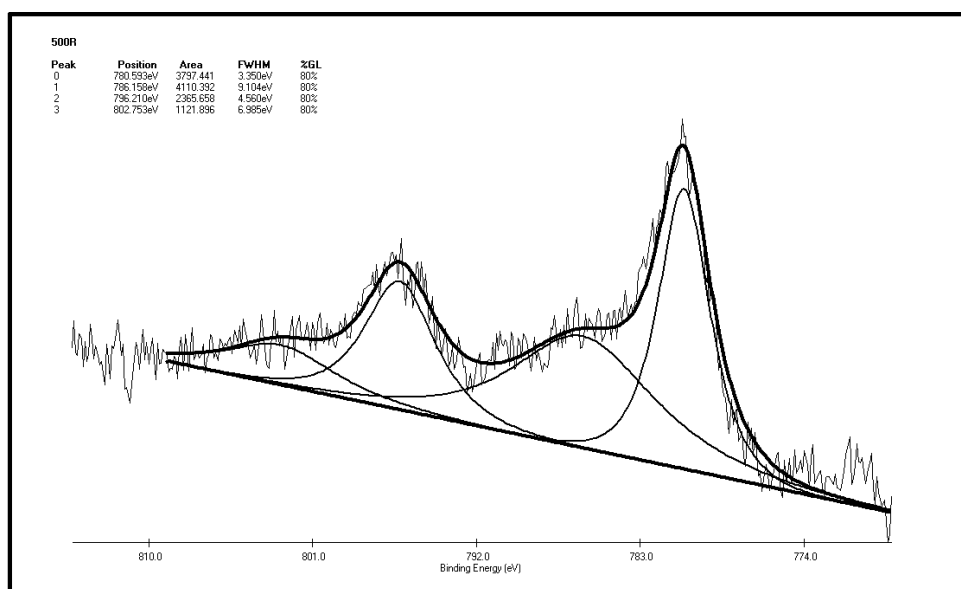


Figure S3. Co 2p XPS spectrum of Ru-Co/ZrO<sub>2</sub> reduced at 500 °C.

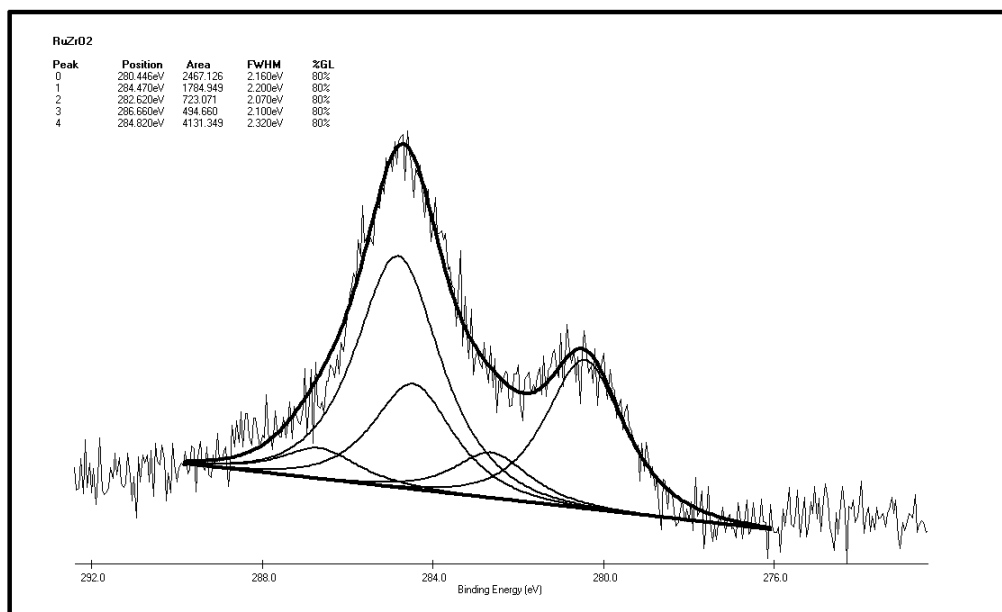


Figure S4. Ru 3d XPS spectrum of Ru/ZrO<sub>2</sub> reduced at 250 °C.

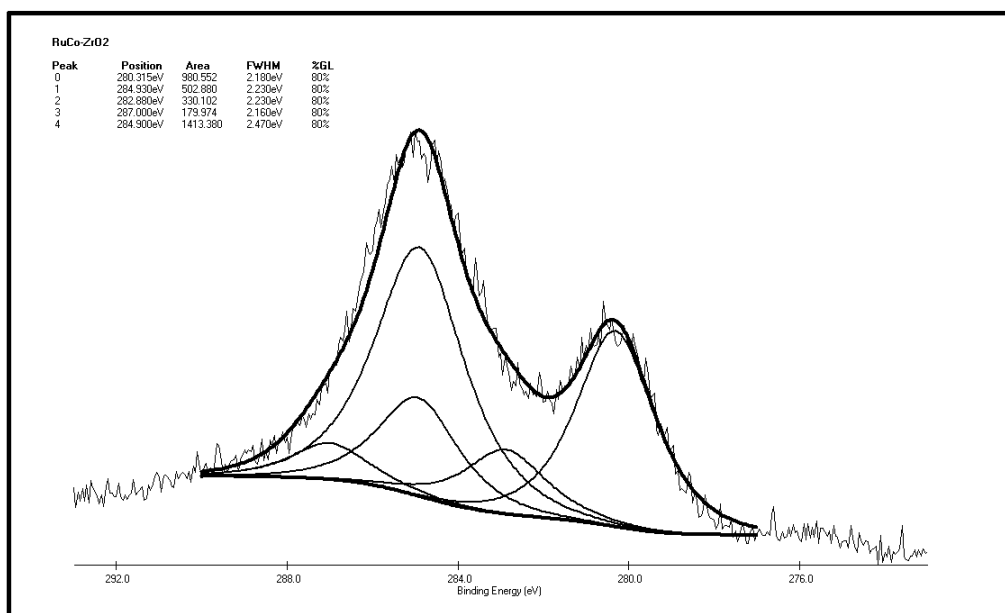


Figure S5. Ru 3d XPS spectrum of Ru-Co/ZrO<sub>2</sub> reduced at 250 °C.

