

Supplementary Information

Production of propionic acid via hydrodeoxygenation of lactic acid over Fe_xO_y catalysts- Support Information

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Table S1 BET data of the used catalysts

Catalyst	S_{BET} (m^2/g)
Used Fe	0.24
Used FeO	0.30
Used Fe_3O_4	53.1
Used Fe_2O_3	26.5

Table S2 H_2 -consumption for reduction of catalysts

Catalyst	H_2 -consumption for reduction of catalysts ($\mu\text{mol H}_2/\text{g}$)	
	Low temperature reduction	High temperature reduction
Fresh Fe_2O_3	84.1	70.2
Fresh Fe_3O_4	47.6	73.8
Used Fe_2O_3	4.0	59.5
Used Fe_3O_4	3.9	49.3

Table S3 LA conversion over the catalysts at 360°C.

Catalysts ^a	LA conv. (%)	Sel. ^b (%)				
		PA	AD	AA	PD	ACA
Fe	83.1	13.6	13.5	1.2	1.0	1.8
FeO	84.0	12.5	14.7	1.3	0.8	1.6
Fe_3O_4	89.5	28.6	12.0	1.3	1.1	5.6
Fe_2O_3	90.7	28.1	11.7	1.2	1.0	4.1

^a Catalyst: 0.38 mL, Fe, 1.23g, FeO, 0.90g, Fe_3O_4 , 0.32g, Fe_2O_3 , 0.42 g; carrier gas N_2 , 1mL/min; feed flow rate 1mL/h, LA feedstock 20wt% ; reaction temperature, 360°C; TOS, 3–4 h. ^b LA: lactic acid, PA: propionic acid, AD: acetaldehyde, AA: acrylic acid, PD: 2,3-pentanedione, ACA: acetic acid.

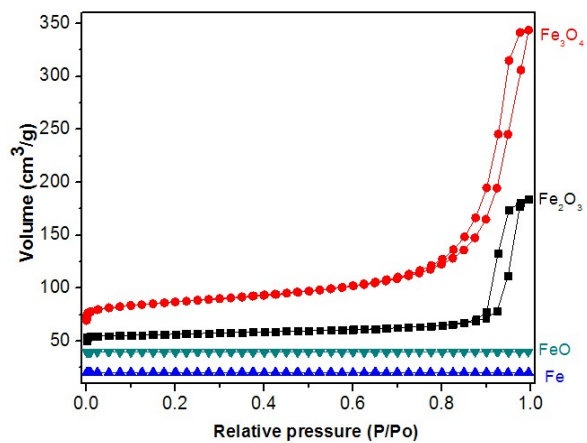


Figure S1 Adsorption isotherms of catalysts

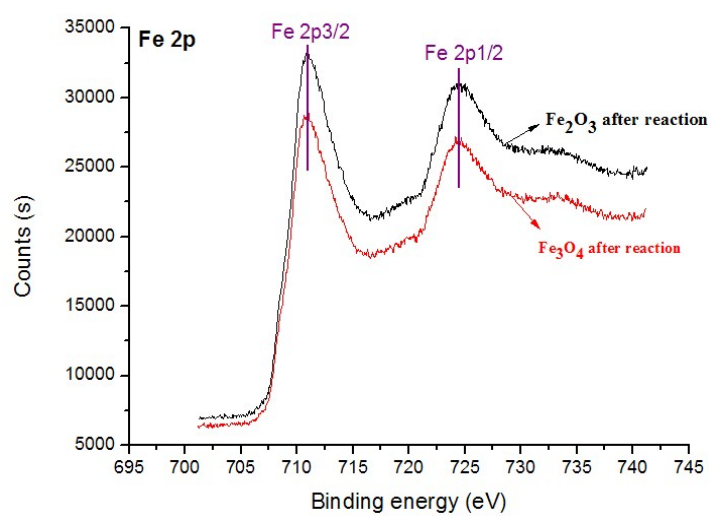
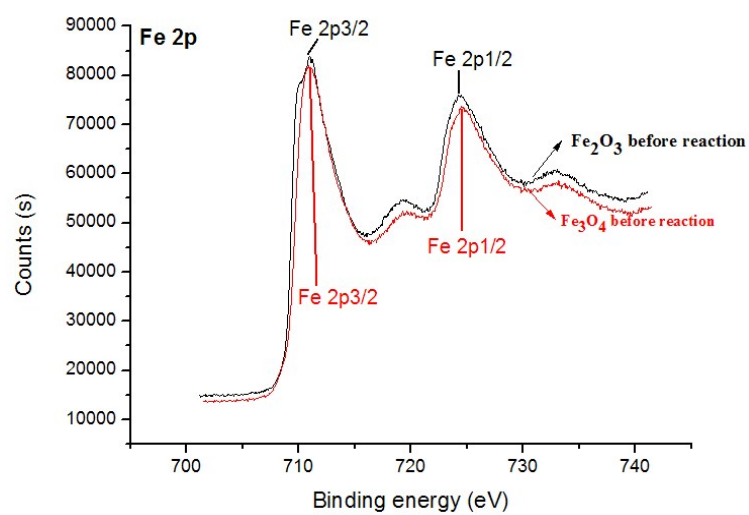


Figure S2 High-resolution XPS profiles of Fe 2p for the fresh catalysts and their corresponding used catalysts