Supplementary Materials

Synergistic promotion of ultra-small Pt nanoparticles and oxygen vacancy in MOF catalyst for ethyl levulinate to valerolactone at room temperature

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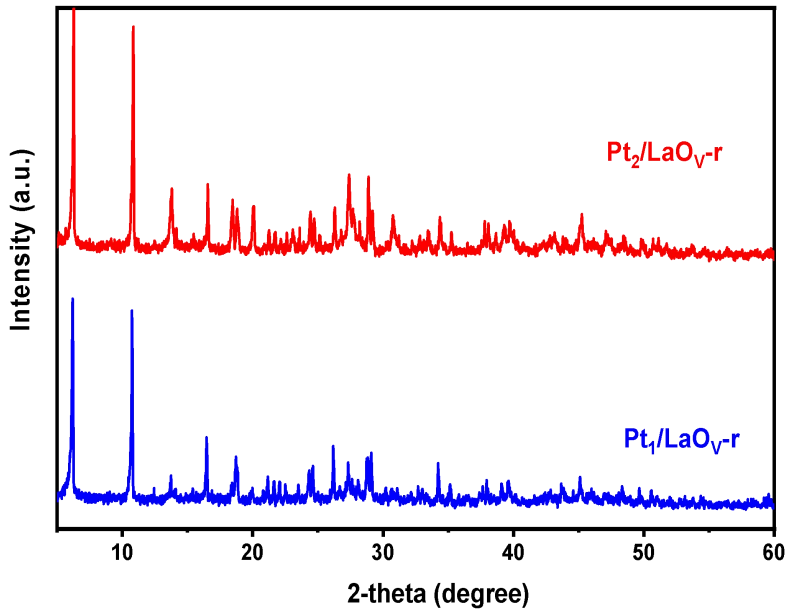
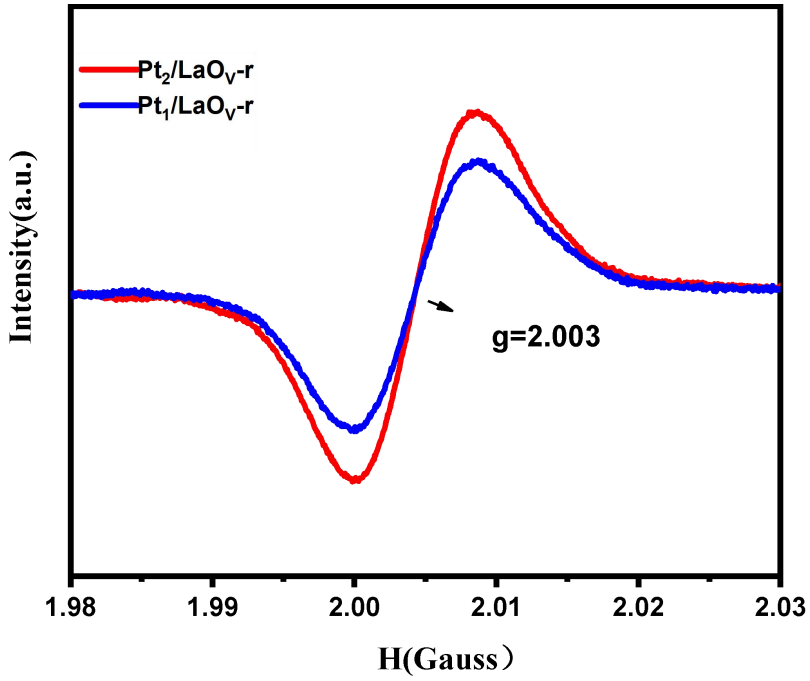
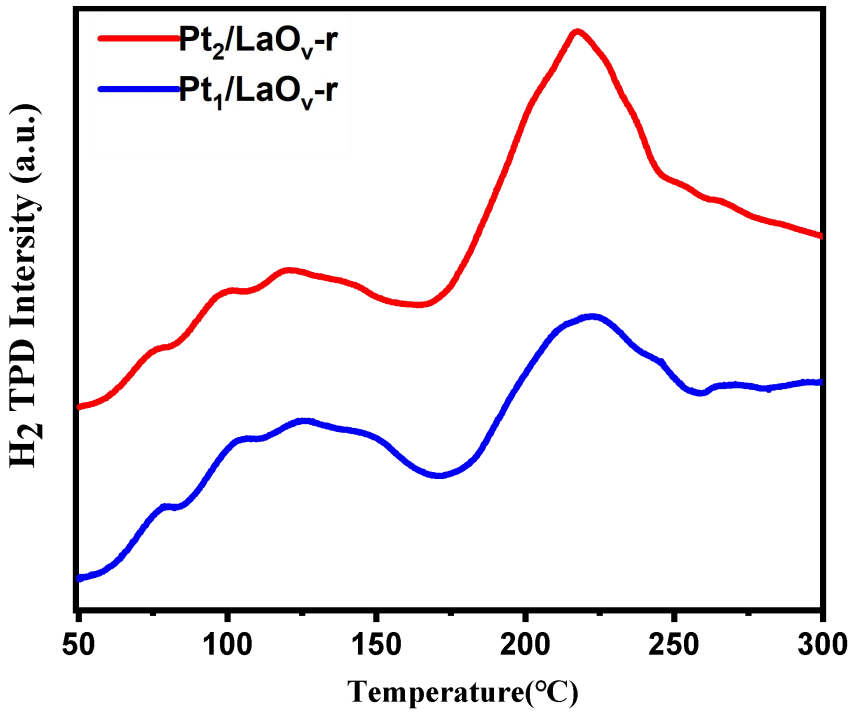


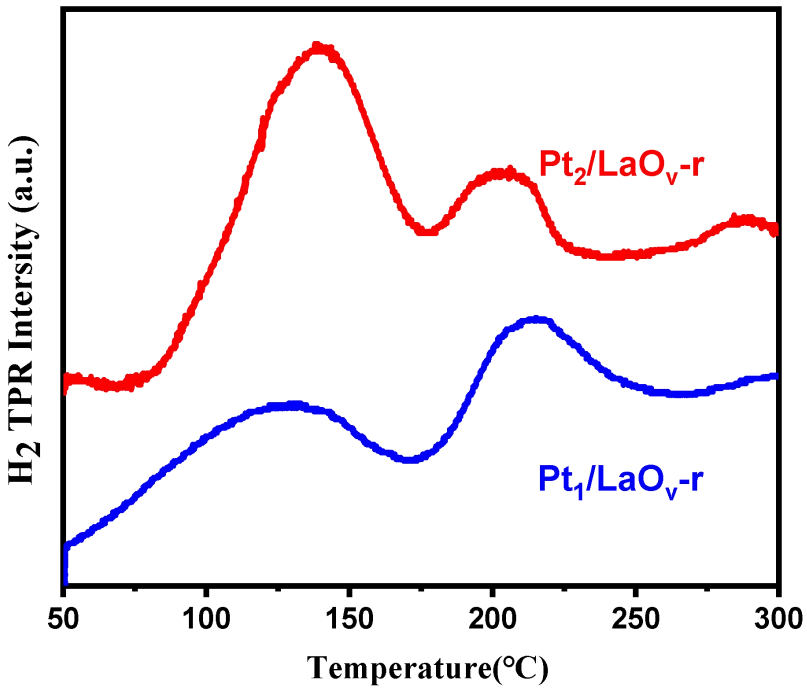
Supplementary Figure 1. XRD patterns of Pt_1/LaO_V-r and Pt_2/LaO_V-r.



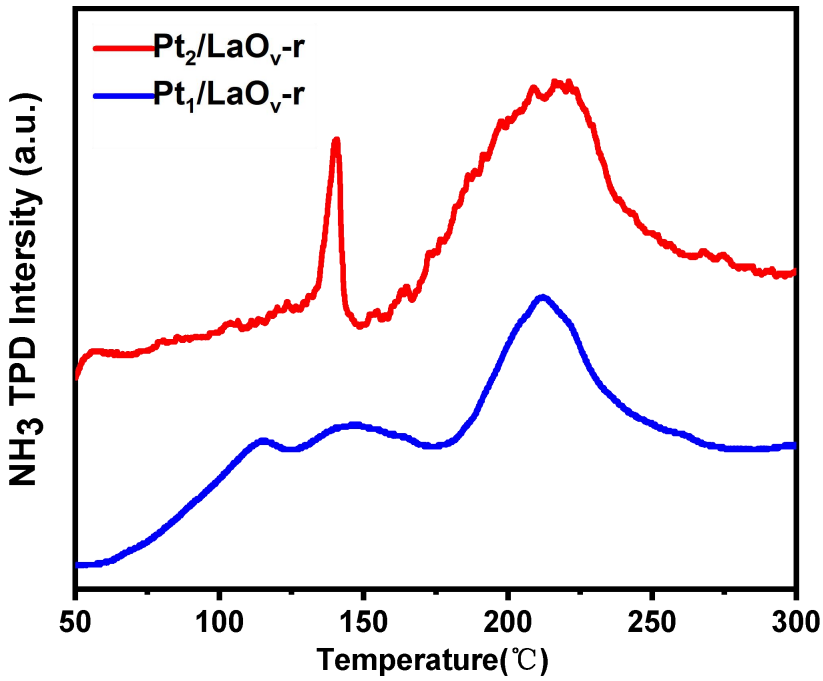
Supplementary Figure 2. EPR spectra of Pt_1/LaO_V-r and Pt_2/LaO_V-r.



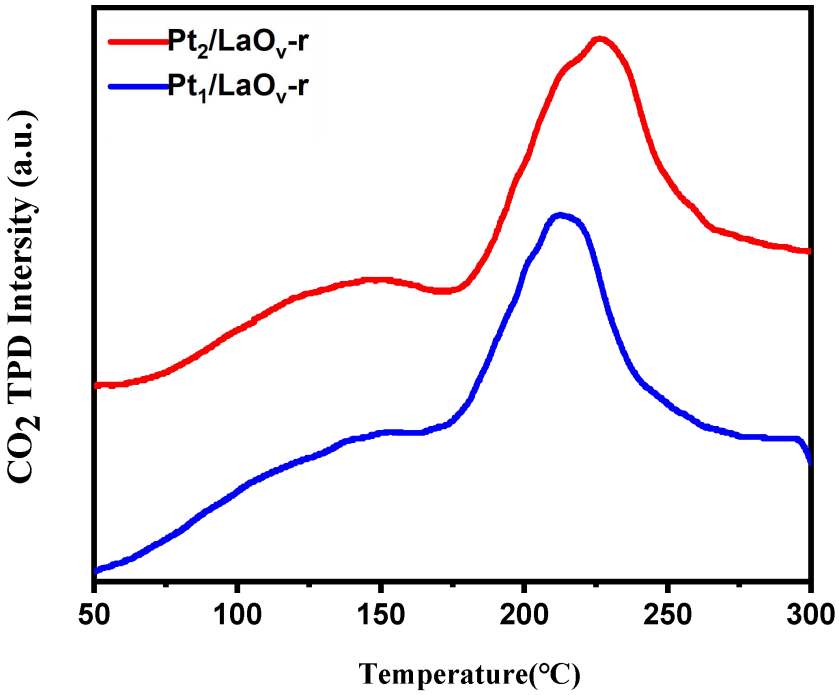
Supplementary Figure 3. H_2-TPD curves for Pt_1/LaO_V-r and Pt_2/LaO_V-r.



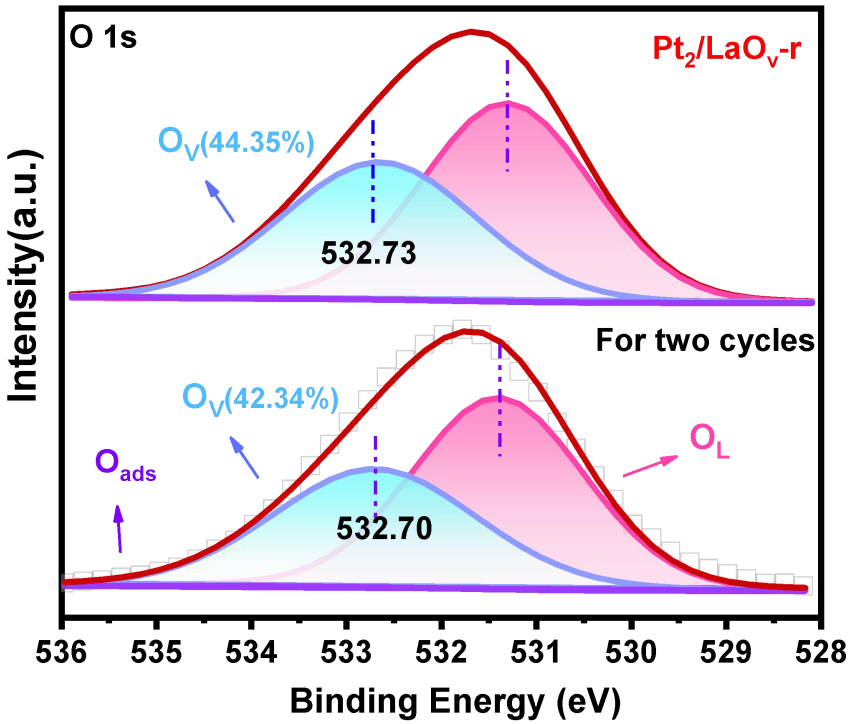
Supplementary Figure 4. H_2-TPR curves of Pt_1/LaO_V-r and Pt_2/LaO_V-r.



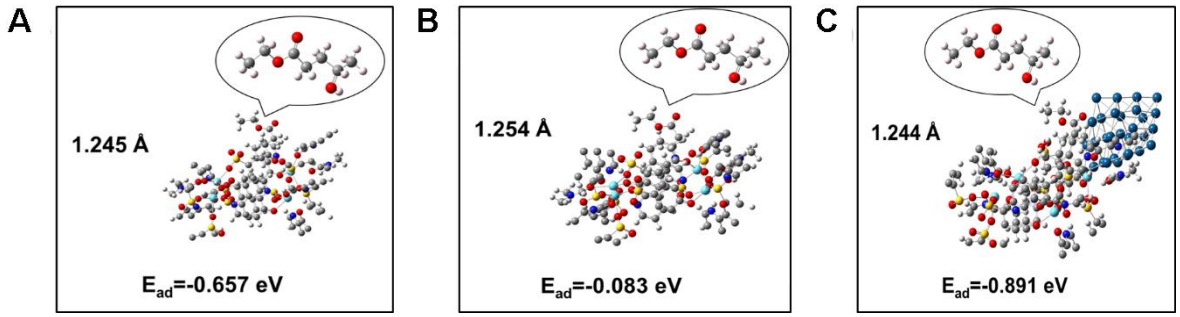
Supplementary Figure 5. NH_3-TPD curves of Pt_1/LaO_V-r and Pt_2/LaO_V-r.



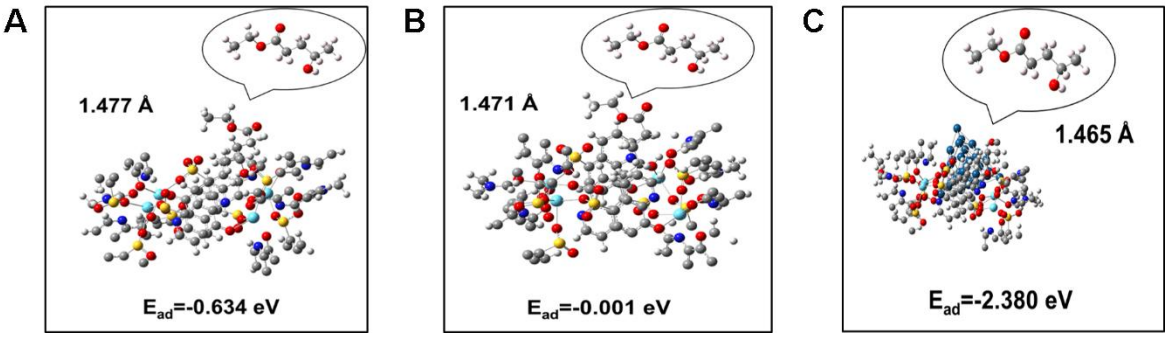
Supplementary Figure 6. CO_2-TPD curves of Pt_1/LaO_V-r and Pt_2/LaO_V-r.



Supplementary Figure 7. XPS spectra of O 1s in Pt_2/LaO_V-r after cycling.



Supplementary Figure 8. (A-C) EL adsorbed on La and Ov in LaO_V-r, La in Pt_2/LaO_V-r.



Supplementary Figure 9. (A-C) Intermediates adsorbed on La and O_V in LaO_V-r, Pt in Pt_2/LaQS.

Supplementary Table 1. the comparison results of the catalytic properties with the existing literature

Catalysts	T (℃)	P (MPa)	t (h)	Solvent	Substrate	Product	Con. (%)	Select. (%)	Ref.
Pt-TiO_2/α-Al_2O_3	150	3	3	H_2O	EL	GVL	98	98	[1]
Pt/$Sn_{0.8}Mn_1O_y$	120	2	6	Dioxane	LA	GVL	99	>99	[2]
$Pt_{0.7}$-$Ce_{0.5}$/TS-1	180	2	6	H_2O	LA	GVL	99	>99	[3]
1.6Pt/mesoporous ZrO_2	240	2.5	24	H_2O	LA	GVL	90	90	[4]
Pt_2/LaO_V-r	80	2	4	2-PrOH	EL	GVL	>99	>99	This Work
Pt_2/LaO_V-r	25	2	36	2-PrOH	EL	GVL	>99	>99	This Work

Supplementary Table 2. Acid contents of different catalysts measured by NH_3-TPD

Entry	Catalyst	NH_3-TPD acid content (μmol/g)	Medium acid content (μmol/g)
1	Pt_2/LaO_V-r	3375.6	1803.6
2	Pt_1/LaO_V-r	2944.5	1561.5
4	Pt_2/LaQS	3248.0	1417.4
5	LaO_V-r	2047.8	376.6
6	LaQS	1992.4	680.9

Supplementary Table 3. Base contents of different catalysts measured by CO_2-TPD

Entry	Catalyst	CO_2-TPD base content (μmol/g)	Medium base content (μmol/g)
1	Pt_2/LaO_V-r	2350.5	1554.6
2	Pt_1/LaO_V-r	2022.3	1133.9
4	Pt_2/LaQS	1707.3	812.1
5	LaO_V-r	1189.4	459.4
6	LaQS	387.6	322.3

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