

Supporting Information

Enhancing Catalytic Efficiency in Long-Chain Linear α -Olefin Epoxidation: A Study of CaSnO_3 -Based Catalysts

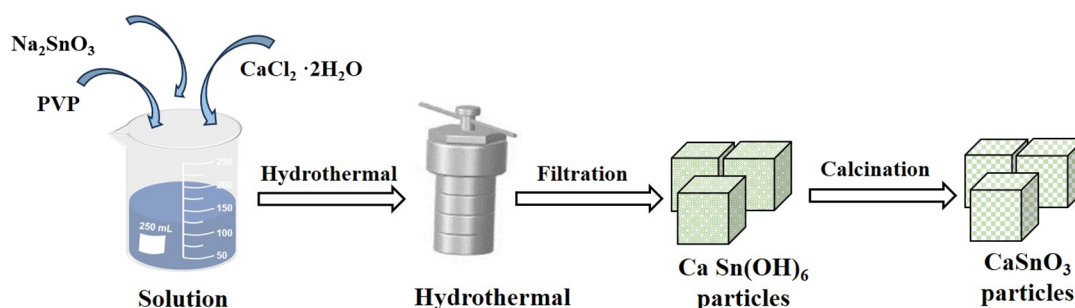
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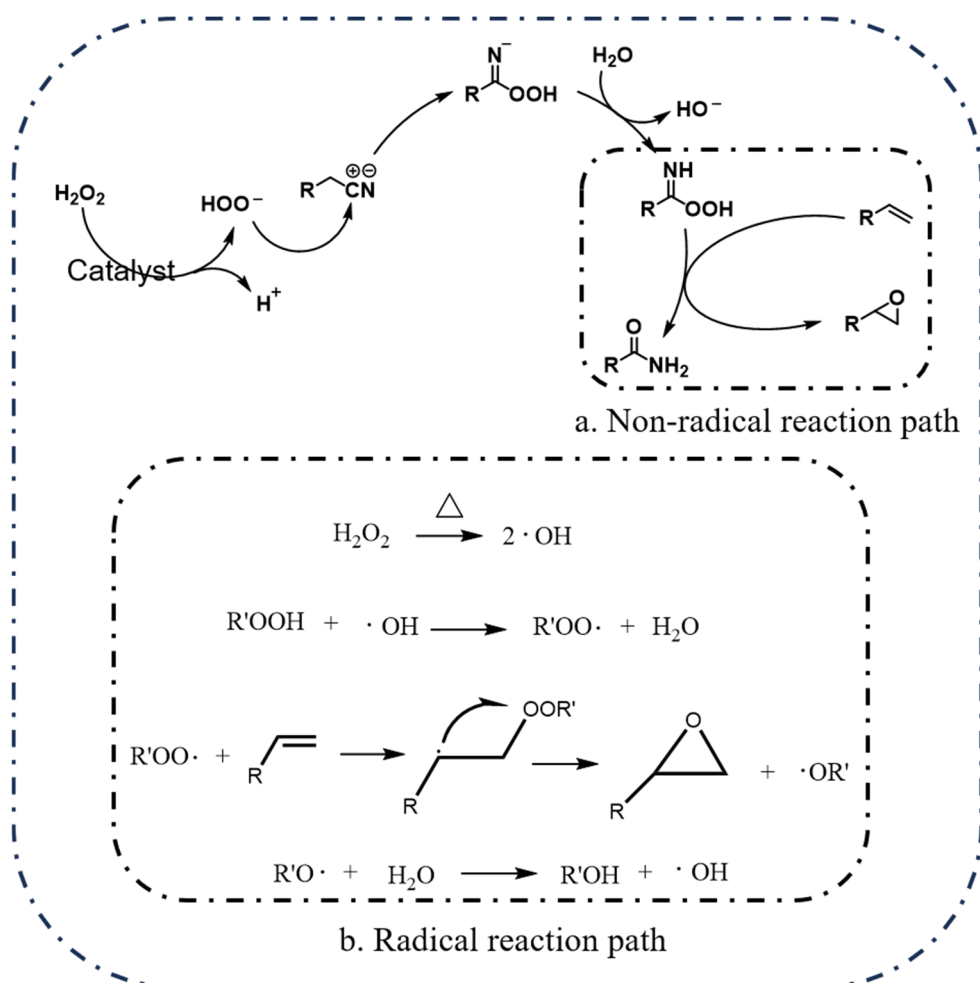
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Scheme S1. The diagram of the synthesis of CaSnO_3 catalyst.



Scheme S2. Possible reaction mechanism of Payne's epoxidation.

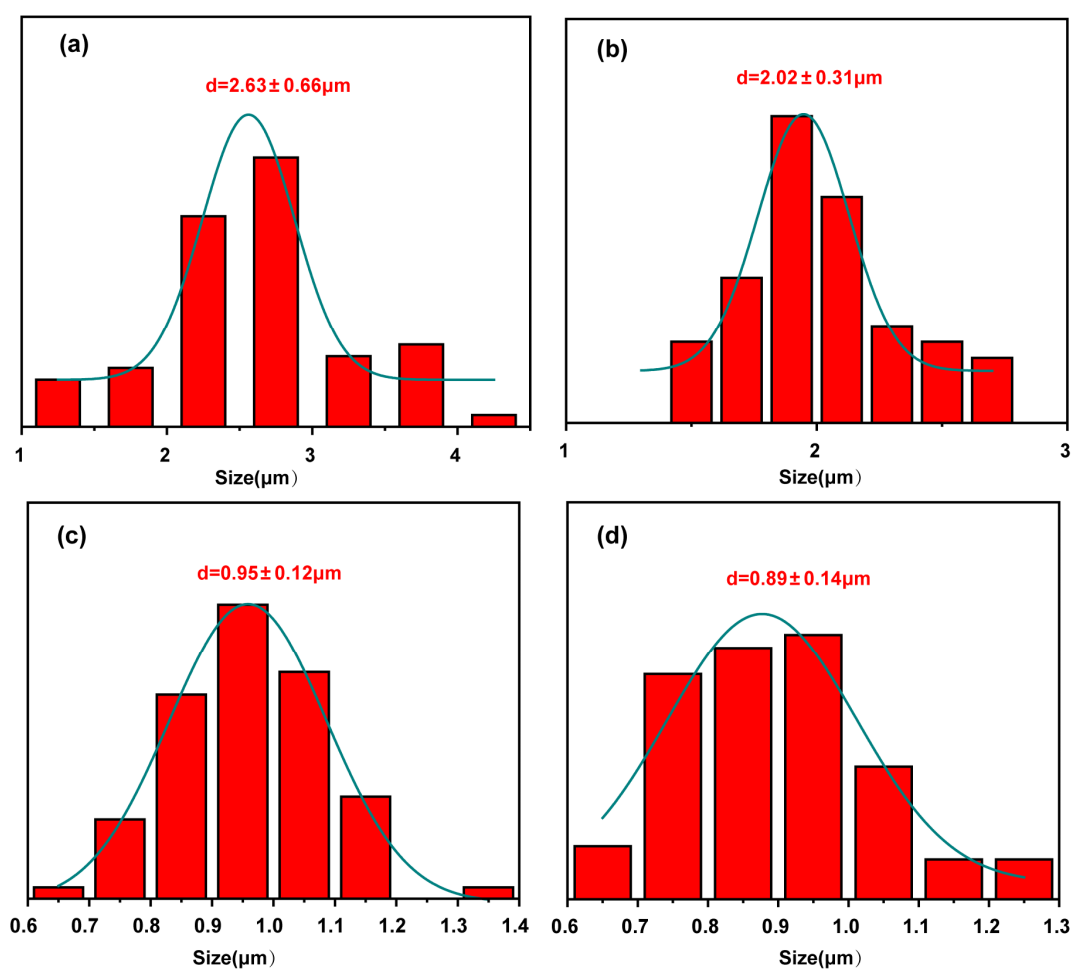


Figure S1. Particle size distribution of CS-1, CS-2, CS-3 and CS-4.

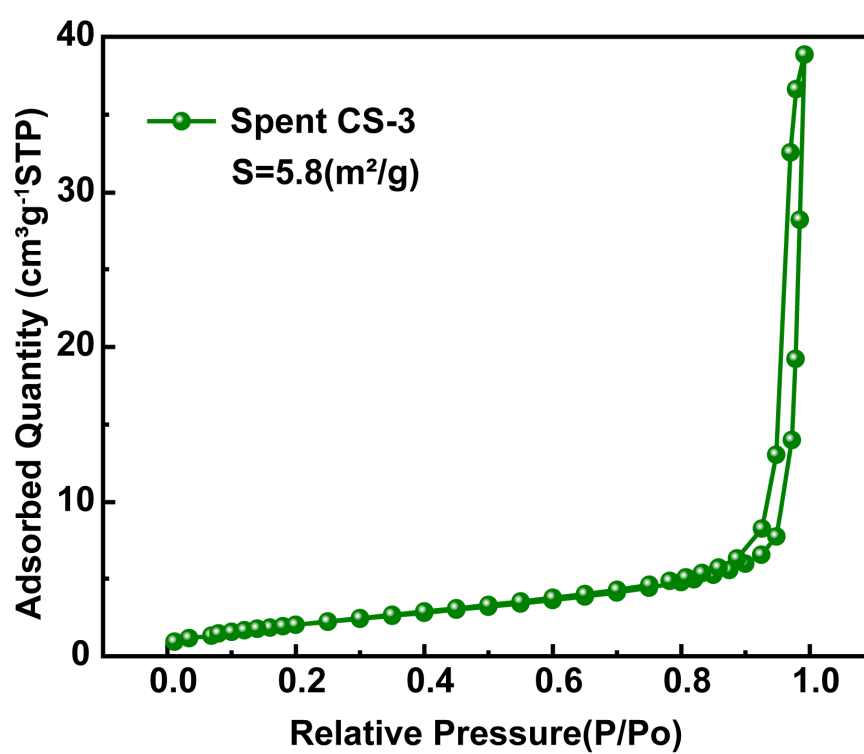


Figure S2. N₂ adsorption–desorption isotherms of the spent CS-3.

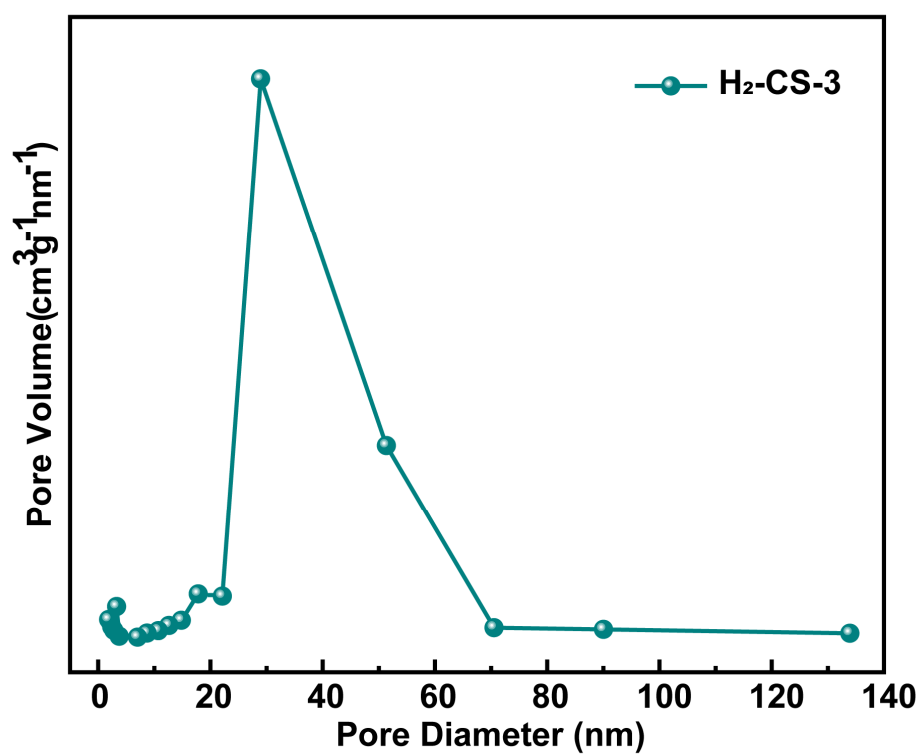


Figure S3. pore size distribution of H₂-CS-3.

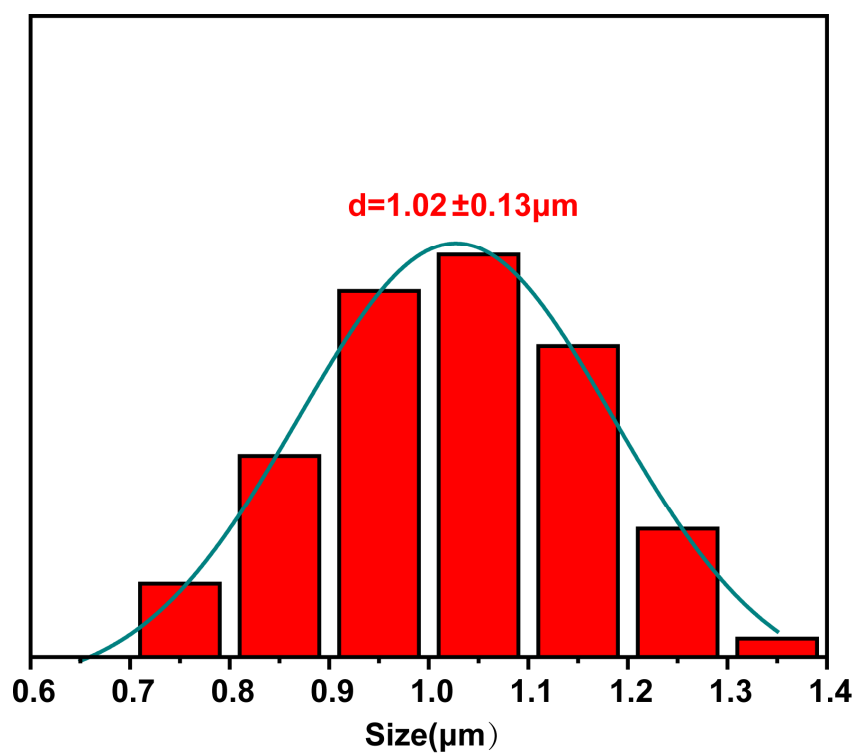


Figure S4. Particle size distribution of H₂-CS-3.

Table S1. The amount of CO₂ desorption from the different type of CaSnO₃ catalyst.

The amount of CO ₂ desorption from each type of site (mmol g _{catalyst} ⁻¹) and their fraction (%)				
Sample	Weak	Medium	Strong	Total basic sites (mmol g _{catalyst} ⁻¹)
CS-1	0.021	0.069	0.009	0.099
CS-2	0.017	0.073	0.026	0.116
CS-3	0.017	0.080	0.024	0.121
H ₂ -CS-3	0.017	0.088	0.025	0.130

Table S2. Binding energy and relative area percentage of oxygen species in CS-1, CS-2, CS-3, H2-CS-3.

Catalyst	O1s binding energy(eV)			Relative area (%)			V _o ratio
	O _{lat}	O _v	O _{ads}	O _{lat}	O _v	O _{ads}	O _v / (O _{lat} + O _v + O _{ads})
CS-1	529.91	531.86	532.90	77.5	16.3	6.2	0.16
CS-2	529.90	531.86	532.90	60.3	27.7	12.0	0.28
CS-3	529.90	531.87	532.90	60.6	30.9	8.4	0.31
H ₂ -CS-3	530.10	532.0	533.1	59.2	33.2	7.6	0.33

Table S3. Structural parameters of CS-1, CS-2, CS-3 and CS-4.

Catalyst	S(m ² /g)	V(cm ³ /g)	D (μ m)
CS-1	4.8	0.05	2.63
CS-2	5.3	0.05	2.02
CS-3	5.9	0.05	0.95
CS-4	5.9	0.05	0.89
H ₂ -CS-3	6.1	0.05	1.02