

# Catalytic Acetone Oxidation over MnO<sub>x</sub> Catalysts: Regulating Their Crystal Structures and Surface Properties

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**Table S1.** Catalytic activity for acetone oxidation over various catalysts of previous research.

Catalysts	GHSV (mL g <sub>cat</sub> <sup>-1</sup> h <sup>-1</sup> )	Activity (T <sub>90</sub> , °C)	Reference
CuCo <sub>2</sub> O <sub>4</sub>	93,000	183	1
Cu <sub>0.5</sub> -NFs	79,000	225	2
10V-TiC	72,000	292	3
MnO <sub>2</sub> -WN	60,000	132	This work
Pt <sub>1.9nm</sub> /TiO <sub>2</sub>	40,000	207	4
CeO <sub>2</sub> -Pt/TiO <sub>2</sub>	40,000	245	5
Au-Pd/α-MnO <sub>2</sub>	40,000	180	6
CoAlO-C-Mn-30	33,000	173	7
0.8Pt-G/@Zr	30,000	210	8
Pd <sub>0.01</sub> Mn <sub>0.2</sub> /Ti	30,000	259	9
GdMn <sub>2</sub> O <sub>5</sub>	24,000	160	10
CeO <sub>2</sub> /Co <sub>3</sub> O <sub>4</sub>	18,600	180	11
CuMn <sub>2</sub> O <sub>x</sub>	18,000	150	12
Co <sub>3</sub> O <sub>4</sub> @MnO <sub>x</sub> NFs	17,000	177	13
12CoCu-R	6,000	195	14

## References

- Zhang, C.; Wang, J. G.; Yang, S. F.; Liang, H.; Men, Y., Boosting total oxidation of acetone over spinel MCo<sub>2</sub>O<sub>4</sub> (M = Co, Ni, Cu) hollow mesoporous spheres by cation-substituting effect. *Journal of Colloid and Interface Science* **2019**, 539, 65-75.
- Qin, R.; Chen, J. H.; Gao, X.; Zhu, X. B.; Yu, X. N.; Cen, K. F., Catalytic oxidation of acetone over CuCeO<sub>x</sub> nanofibers prepared by an electrospinning method. *RSC Adv.* **2014**, 4, (83), 43874-43881.
- Chen, J. H.; Yu, X. N.; Zhu, X. C.; Zheng, C. H.; Gao, X.; Cen, K. F., Electrospinning synthesis of vanadium-TiO<sub>2</sub>-carbon composite nanofibrous membranes as effective catalysts for the complete oxidation of low-concentration acetone. *Appl. Catal., A* **2015**, 507, 99-108.
- Song, R. Z.; Bai, Y.; Li, X. R.; Zhu, J. L.; Zhang, H. X.; Shi, Y. C.; Li, K.; Wang, B.; Zhang, H. S.; Yang, Y. F.; Zhang, Z. J., Plasma Circular RNA DYM Related to Major Depressive Disorder and Rapid Antidepressant Effect Treated by Visual Cortical Repetitive Transcranial Magnetic Stimulation. *Journal of Affective Disorders* **2020**, 274, 486-493.

5. Wang, Z. W.; Li, S.; Xie, S. H.; Liu, Y. X.; Dai, H. X.; Guo, G. S.; Deng, J. G., Supported ultralow loading Pt catalysts with high H<sub>2</sub>O-, CO<sub>2</sub>- and SO<sub>2</sub>-resistance for acetone removal. *Applied Catalysis a-General* **2019**, 579, 106-115.
6. Xia, Y. S.; Xia, L.; Liu, Y. X.; Yang, T.; Deng, J. G.; Dai, H. X., Concurrent catalytic removal of typical volatile organic compound mixtures over Au-Pd/ $\alpha$ -MnO nanotubes. *Journal of Environmental Sciences* **2018**, 64, 276-288.
7. Zhao, Q.; Liu, Q.; Song, C.; Ji, N.; Ma, D.; Lu, X., Enhanced catalytic performance for VOCs oxidation on the CoAlO oxides by KMnO<sub>4</sub> doped on facile synthesis. *Chemosphere* **2019**, 218, 895-906.
8. Kondratowicz, T.; Drozdek, M.; Michalik, M.; Gac, W.; Gajewska, M.; Kustrowski, P., Catalytic activity of Pt species variously dispersed on hollow ZrO<sub>2</sub> spheres in combustion of volatile organic compounds. *Applied Surface Science* **2020**, 513.
9. Zhao, Q.; Ge, Y. L.; Fu, K. X.; Zheng, Y. F.; Liu, Q. L.; Song, C. F.; Ji, N.; Ma, D. G., Catalytic performance of the Pd/TiO<sub>2</sub> modified with MnO<sub>x</sub> catalyst for acetone total oxidation. *Applied Surface Science* **2019**, 496.
10. Dong, A. Q.; Gao, S.; Wan, X.; Wang, L. X.; Zhang, T.; Wang, L.; Lang, X. Y.; Wang, W. C., Labile oxygen promotion of the catalytic oxidation of acetone over a robust ternary Mn-based mullite GdMn<sub>2</sub>O<sub>5</sub>. *Appl. Catal. B-Environ.* **2020**, 271.
11. Zheng, Y. F.; Zhao, Q.; Shan, C. P.; Lu, S. C.; Su, Y.; Han, R.; Song, C. F.; Ji, N.; Ma, D. G.; Liu, Q. L., Enhanced Acetone Oxidation over the CeO<sub>2</sub>/Co<sub>3</sub>O<sub>4</sub> Catalyst Derived from Metal-Organic Frameworks. *Acs Applied Materials & Interfaces* **2020**, 12, (25), 28139-28147.
12. Wang, L.; Sun, Y.; Zhu, Y.; Zhang, J.; Ding, J.; Gao, J.; Ji, W.; Li, Y.; Wang, L.; Ma, Y., Revealing the mechanism of high water resistant and excellent active of CuMn oxide catalyst derived from Bimetal-Organic framework for acetone catalytic oxidation. *Journal of Colloid and Interface Science* **2022**, 622, 577-590.
13. Zhao, Q.; Zheng, Y.; Song, C.; Liu, Q.; Ji, N.; Ma, D.; Lu, X., Novel monolithic catalysts derived from in-situ decoration of Co<sub>3</sub>O<sub>4</sub> and hierarchical Co<sub>3</sub>O<sub>4</sub>@MnO<sub>x</sub> on Ni foam for VOC oxidation. *Applied Catalysis B: Environmental* **2020**, 265, 118552.
14. Zheng, Y.; Su, Y.; Pang, C.; Yang, L.; Song, C.; Ji, N.; Ma, D.; Lu, X.; Han, R.; Liu, Q., Interface-Enhanced Oxygen Vacancies of CoCuO<sub>x</sub> Catalysts In Situ Grown on Monolithic Cu Foam for VOC Catalytic Oxidation. *Environmental Science & Technology* **2022**, 56, (3), 1905-1916.