

## Supporting Information

### **Recent Advances of the manganese-copper bimetallic oxide catalysts for catalytic oxidation of VOC: types, preparation methods and catalytic performances**

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Table S1 The detailed catalyst types, reaction condition and key VOC catalytic oxidation performance parameters of the different catalysts

VOCs	Con. /ppm	Catalyst types	Catalysts	WHSV /GHSV	T <sub>90</sub> /°C	Ref.
Toluene	500	CuO <sub>x</sub> /MnO <sub>x</sub>	CuO/MnO <sub>2</sub> -R-10	60000 h <sup>-1</sup>	234	1
Toluene	1000	MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	Mn <sub>5</sub> Cu <sub>1</sub>	30000 mL/(g·h)	212	2
Toluene	1000	Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	MnCu <sub>0.5</sub>	40000 mL/(g·h)	210	3
Toluene	1000	Cu doped MnO <sub>x</sub>	MnO <sub>2</sub> -CM	40000 mL/(g·h)	209	4
Toluene	500	Cu doped MnO <sub>x</sub>	CuMnO <sub>x</sub> -HS	60000 mL/(g·h)	212	5
Toluene	500	CuO <sub>x</sub> /MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	CM-4	22500 h <sup>-1</sup>	213	6
Toluene	1000	MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	Cu1Mn1O-500	60000(GHSV)	214	7
Toluene	1000	Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	MnCu	40000 mL/(g·h)	214	8
Toluene	1000	MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	CMO-ALK60	60000 h <sup>-1</sup>	245	9
Toluene	1000	Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	2NaOH/CuMn <sub>2</sub> O <sub>4</sub>	20000 h <sup>-1</sup>	188	10
Toluene	500	CuO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	Cu <sub>2</sub> Mn <sub>1</sub> O <sub>x</sub> -500	10000 h <sup>-1</sup>	220	11
Toluene	1000	Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	CuMn <sub>2</sub> O <sub>4</sub> -EG-350	20000 h <sup>-1</sup>	208	12
Toluene	500	Cu doped MnO <sub>x</sub>	MnO <sub>2</sub> -OV3	22500 mL/(g·h)	216	13
Toluene	1000	Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	CM2-400	5000 h <sup>-1</sup>	188	14
Toluene	500	Cu doped MnO <sub>x</sub>	CuMnO <sub>2</sub> -500-Q	6000 mL/(g·h)	235	15
Toluene	500	CuO <sub>x</sub> /MnO <sub>x</sub>	CuO/MnO <sub>2</sub>	60000 h <sup>-1</sup>	238	16
Toluene	1000	Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	CuMn-500-1	36000 mL/(g·h)	220	17
Toluene	500	MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	CMO-2	60000 h <sup>-1</sup>	220	18
Toluene	1000	MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	MnO <sub>2</sub> /CMO	60000 mL/(g·h)	220	19
Toluene	1000	Cu doped MnO <sub>x</sub>	Cu-MnO <sub>2</sub>	40000 mL/(g·h)	228	20
Toluene	500	MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	Mn <sub>85</sub> Cu <sub>15</sub>	20000 h <sup>-1</sup>	220	21
Propylene	500	MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	Mn <sub>85</sub> Cu <sub>15</sub>	20000 h <sup>-1</sup>	190	21
Ethylene	500	Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	Mn <sub>55</sub> Cu <sub>45</sub>	20000 h <sup>-1</sup>	220	21
Benzene	500	Cu doped MnO <sub>x</sub>	Cu <sub>0.1</sub> -α-MnO <sub>2</sub>	60000 mL/(g·h)	223	22
Benzene	900	Cu doped MnO <sub>x</sub>	Cu-MnO <sub>2</sub>	60000 mL/(g·h)	220	23
Acetone	1000	CuO <sub>x</sub> /MnO <sub>x</sub>	CuMn <sub>1.0</sub>	90000 mL/(g·h)	155	24
Acetone	1019	CuO <sub>x</sub> /MnO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	CuMn <sub>2</sub> O <sub>x</sub>	18000 mL/(g·h)	150	25
Acetone	1000	CuO <sub>x</sub> /Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	0.3-KOH/CMO	30000 mL/(g·h)	170	26
m-Xylene	300	Cu <sub>x</sub> Mn <sub>3-x</sub> O <sub>4</sub>	CuMn <sub>2</sub> O <sub>4</sub>	60000 mL/(g·h)	246	27

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