

Supporting Information for

Controllable Wet Synthesis of Multicomponent Copper-Based Catalysts for Rochow Reaction

Yanzhao Zhai,^{a, b} Yongjun Ji,^{*, a} Guangna Wang,^a

Yongxia Zhu,^a Hezhi Liu,^a Ziyi Zhong^c and Fabing Su^{*, a}

^a *State Key Laboratory of Multiphase Complex Systems, Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China 100190*

^b *School of Chemical and Environmental Engineering, China University of Mining and Technology(Beijing), Beijing, China 100083*

^c *School of Chemical & Biomedical Engineering, Nanyang Technological University, 62 Nanyang Drive, Singapore 637459*

^{*}To whom correspondence should be addressed. E-mail address: yjji@ipe.ac.cn (Y. Ji), fbsu@ipe.ac.cn (F. Su), Tel.: +86-10-82544850, Fax: +86-10-82544851.

Table S1 The GC results of Rochow reaction over CuO catalyst.

Peak	Retention time (min)	Peak height	Peak area (%)	Product
1	4.563	7.50504	0.17264	LB
2	4.701	36.43813	0.83818	M2H
3	4.815	646.49908	14.87131	M1H
4	5.061	62.01498	1.42652	M3
5	5.220	5.24685	0.12069	LB
6	5.290	543.63751	12.50521	M1
7	5.424	2872.20459	66.06886	M2
8	5.695	163.77458	3.76728	HB
9	8.250	9.96898	0.22931	HB

Table S2 The GC results of Rochow reaction over CuO-Cu₂O catalyst.

Peak	Retention time (min)	Peak height	Peak area (%)	Product
1	4.711	10.01236	0.36846	M2H
2	4.826	249.07608	9.16608	M1H
3	4.931	10.67913	0.39300	LB
4	5.071	26.06318	0.95913	M3
5	5.298	365.20004	11.33948	M1
6	5.428	1866.02429	68.67028	M2
7	5.701	180.82475	6.65441	HB
8	8.250	4.85038	0.17850	HB
9	9.454	4.63794	0.17068	HB

Table S3 The GC results of Rochow reaction over CuO-Cu₂O-Cu catalyst.

Peak	Retention time (min)	Peak height	Peak area (%)	Product
1	4.714	2.19567	0.87165	M2H
2	4.832	16.88912	7.17394	M1H
3	5.075	3.80242	1.48268	M3
4	5.303	22.92574	10.14532	M1
5	5.428	180.16051	79.72640	M2

Table S4 The GC results of Rochow reaction over Cu₂O-Cu catalyst.

Peak	Retention time (min)	Peak height	Peak area (%)	Product
1	4.563	7.31850	0.13848	LB
2	4.703	56.02808	1.06017	M2H
3	4.818	594.04938	11.24066	M1H
4	5.063	52.86643	1.00034	M3
5	5.292	602.89203	11.40798	M1
6	5.427	3793.27710	71.77675	M2
7	5.695	160.75504	3.04182	HB
8	8.234	12.31189	0.23297	HB
9	9.445	5.32894	0.10083	HB

Table S5 The GC results of Rochow reaction over Cu catalyst.

Peak	Retention time (min)	Peak height	Peak area (%)	Product
1	4.563	9.16368	0.28145	LB
2	4.695	30.19755	0.92746	M2H
3	4.810	747.92090	22.97106	M1H
4	5.057	31.51476	0.96792	M3
5	5.287	712.32538	21.87780	M1
6	5.428	1540.87329	47.32518	M2
7	5.691	170.31116	5.23080	HB
8	8.257	7.99641	0.26585	HB
9	9.477	5.62402	0.15248	HB

It should be noted here that the peaks of which retention time was located in ca. 4.34 and 6.94 are assignable to those of toluene.

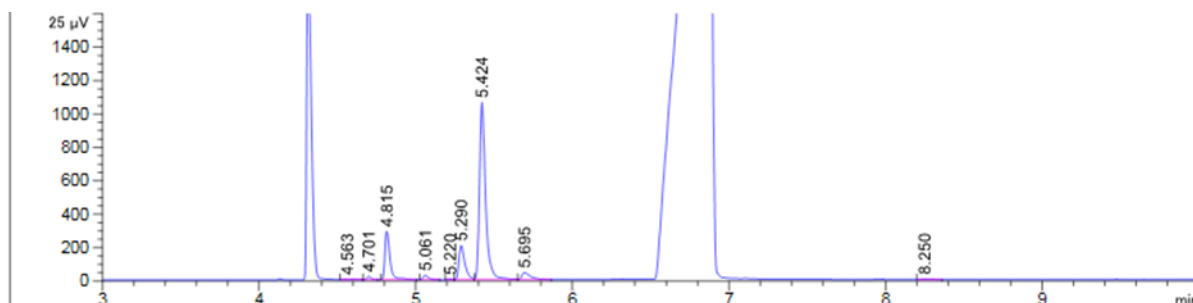


Fig. S1 GC spectra of products after reaction of 24 h for CuO sample.

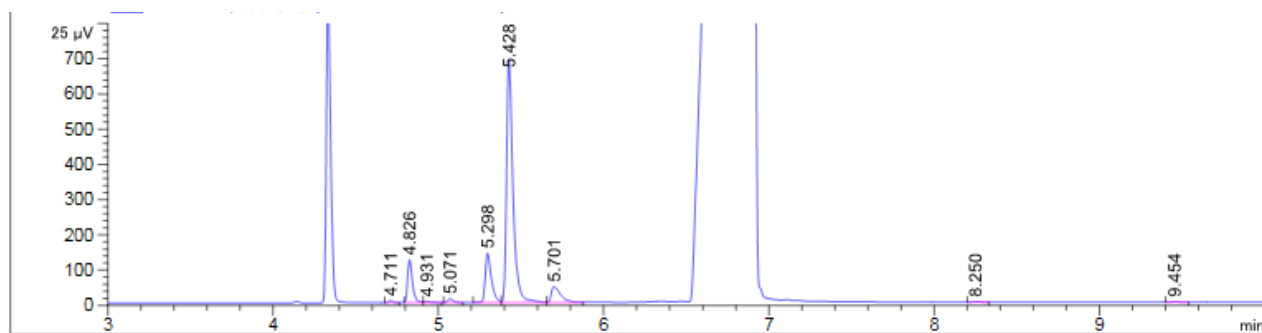


Fig. S2 GC spectra of products after reaction of 24 h for CuO-Cu₂O sample.

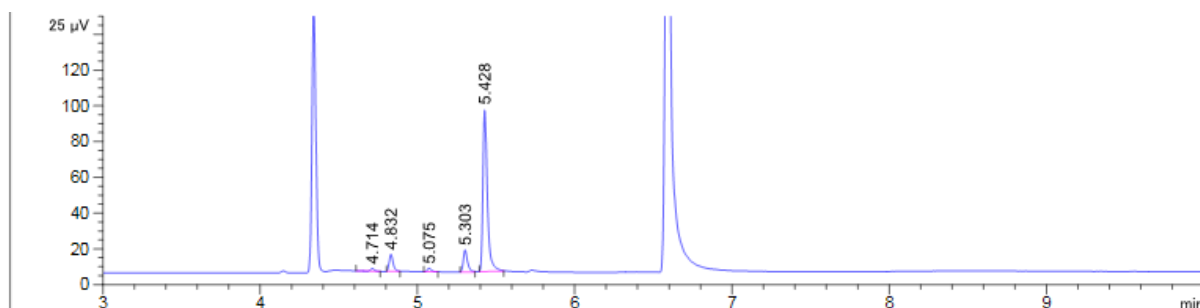


Fig. S3 GC spectra of products after reaction of 24 h for CuO-Cu₂O-Cu sample.

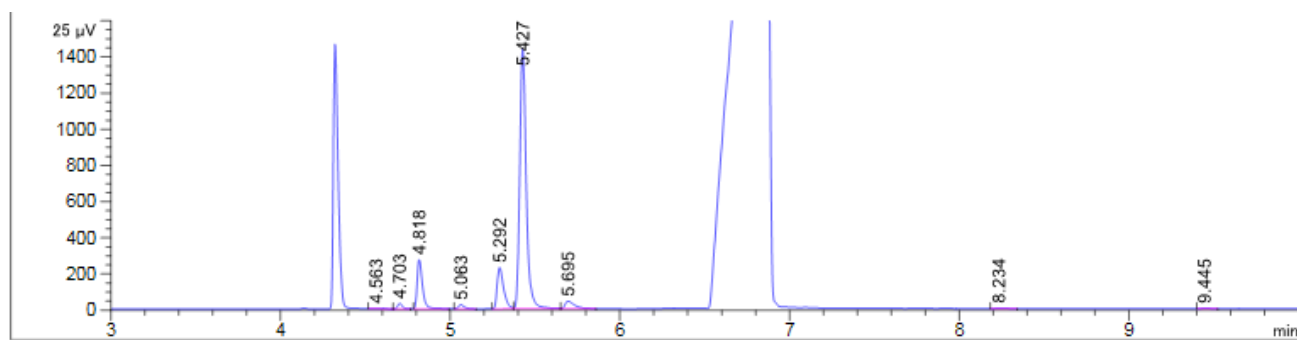


Fig. S4 GC spectra of products after reaction of 24 h for $\text{Cu}_2\text{O-Cu}$ sample.

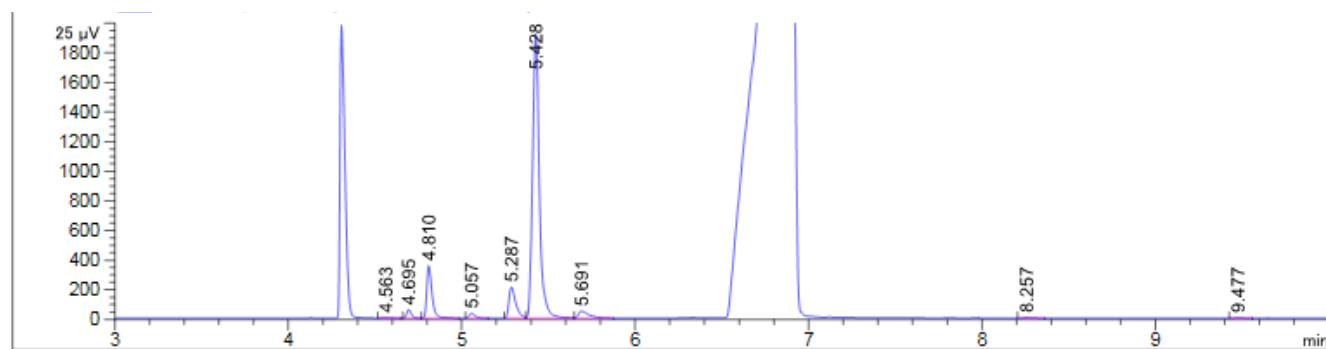


Fig. S5 GC spectra of products after reaction of 24 h for Cu sample.