

Electronic Supporting Information

**Tunable Catalytic Activities and Selectivities of Metal Ions Doped TiO₂
Nanoparticles – Oxidation of Organic Compounds**

*Anqi Wang, Huanwang Jing**

State Key Laboratory of Applied Organic Chemistry, College of Chemistry and Chemical

Engineering

Lanzhou University, 222 South Tianshui Road, Lanzhou, Gansu 730000, P.R. China

**Corresponding author. Tel.: (+86) 0931-8912585; Fax: (+86) 0931-8912582.*

E-mail address: hwjing@lzu.edu.cn

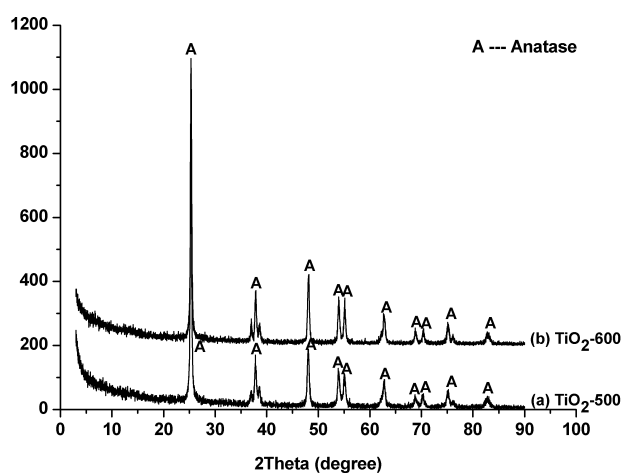


Figure S1 XRD patterns of (a) TiO₂-500, (b) TiO₂-600

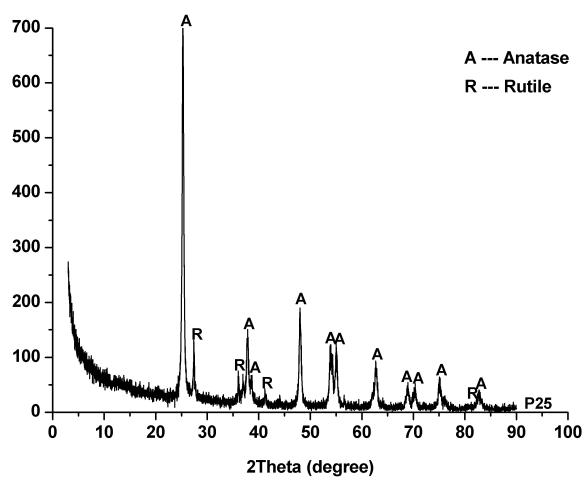


Figure S2 XRD patterns of P25 TiO₂

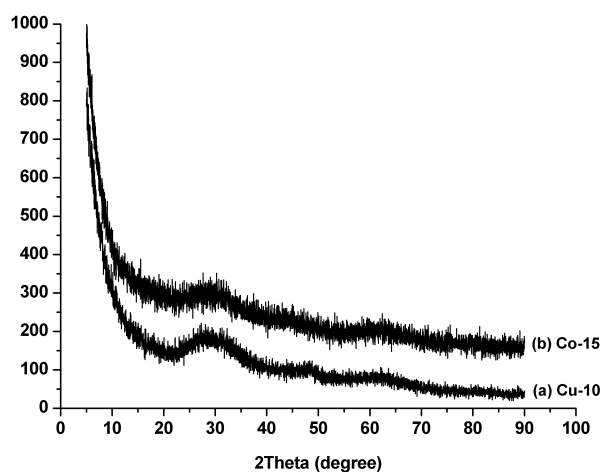


Figure S3 XRD patterns of recycled catalysts (a) Cu-10, (b) Co-15

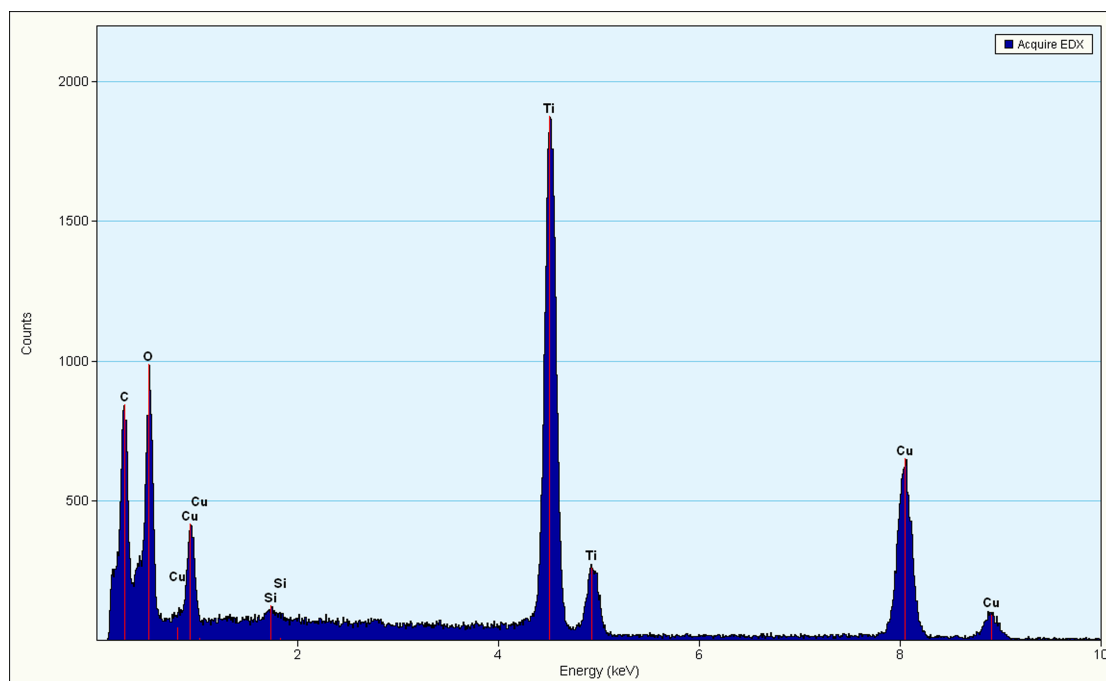


Figure S4 EDX spectrum data of Cu-10 (dark color area)

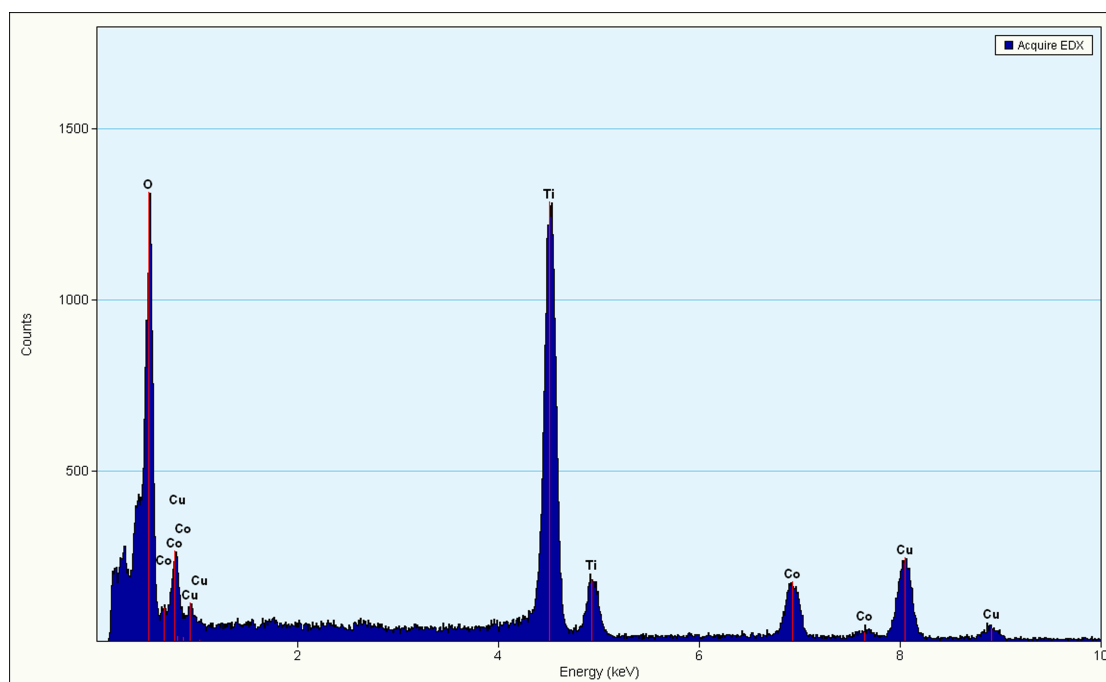


Figure S5 EDX spectrum data of Co-15 (dark color area)

Table S1 Oxidation of styrene catalyzed by TiO₂ nano-catalysts ^a

Entry	Cat.	Conv.(%) ^b	Benzaldehyde		Styrene oxide	
			Sel.(%) ^b	Yield(%) ^c	Sel.(%)	Yield(%)
1	—	3.3	89.4	3.0	10.6	0.3
2	P25	16.3	72.0	11.7	28.0	4.6
3	TiO ₂	14.7	63.0	9.3	37.0	5.4
4	Cr-10	50.4	68.8	34.6	31.2	15.8
5	Mn-10	65.7	85.9	56.5	14.1	9.2
6	Fe-10	55.8	90.8	50.7	9.2	5.1
7	V-10	17.7	70.8	12.5	29.2	5.2
8	Zn-10	31.4	55.9	17.5	44.1	13.9
9	Ni-10	8.4	59.1	5.0	40.9	3.4
10	Ag-10	25.4	87.4	22.2	12.6	3.2
11	Cu-10	97.5	99.4	96.9	0.6	0.6
12	Co-10	80.9	80.2	64.9	19.8	16.0

^a Reaction conditions: catalyst 0.15 g, styrene 5 mmol, TBHP 12.5 mmol, acetonitrile 4 mL, reflux, 4 hours.

^b Determined by GC with FID detector.

^c Yield (%) = Conversion (%) × Selectivity (%).

Table S2 Solvent effect on the oxidation of styrene ^a

Entry	Cat.	Sol.	Conv.(%) ^b	Benzaldehyde		Styrene oxide	
				Sel.(%) ^b	Yield(%) ^c	Sel.(%)	Yield(%)
1	Cu-10	acetonitrile	97.5	99.4	96.9	0.6	0.6
2	Cu-10	ethanol	44.9	52.0	23.3	48.0	21.6
3	Cu-10	acetone	22.7	33.2	7.5	66.8	15.2
4 ^d	Cu-10	DMF	59.9	59.7	35.8	40.3	24.1
5	Cu-10	1,4-dioxane	31.3	30.3	9.5	69.7	21.8
6	Co-15	acetonitrile	94.9	15.3	14.5	84.7	80.4
7	Co-15	ethanol	41.7	34.2	14.3	65.8	27.4
8	Co-15	acetone	58.9	40.0	23.6	60.0	35.3
9 ^d	Co-15	DMF	63.9	45.2	28.9	54.8	35.0
10	Co-15	1,4-dioxane	56.9	59.6	33.9	40.4	23.0

^a Reaction conditions: catalyst 0.15 g, styrene 5 mmol, TBHP 12.5 mmol, solvent 4 mL, reflux, 4 hours.

^b Determined by GC with FID detector.

^c Yield (%) = Conversion (%) × Selectivity (%).

^d Reactions proceeded at 140 °C.