Modification of CuCl$_2$·2H$_2$O by dielectric barrier discharge and its application in hydroxylation of benzene

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Table S1 Structural parameters of samples

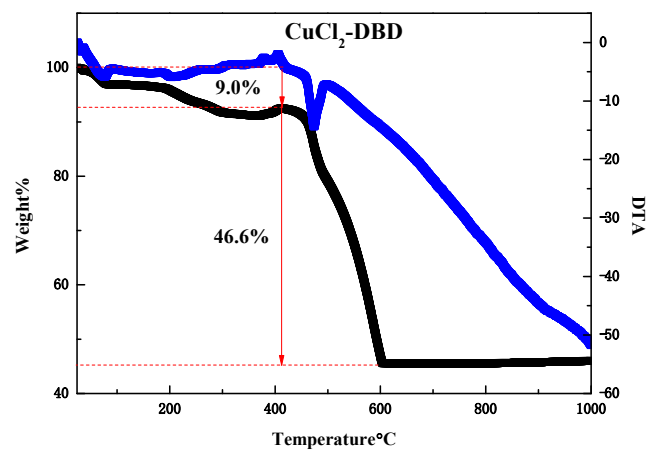| Sample	Specific surface area(m^2/g)(BET)	Pore volume(cm^3/g)	Pore diameter(nm)(BJH)
CuCl$_2$-pure	16.1	0.07	3.92
CuCl$_2$-DBD	9.4	3.28	3.93
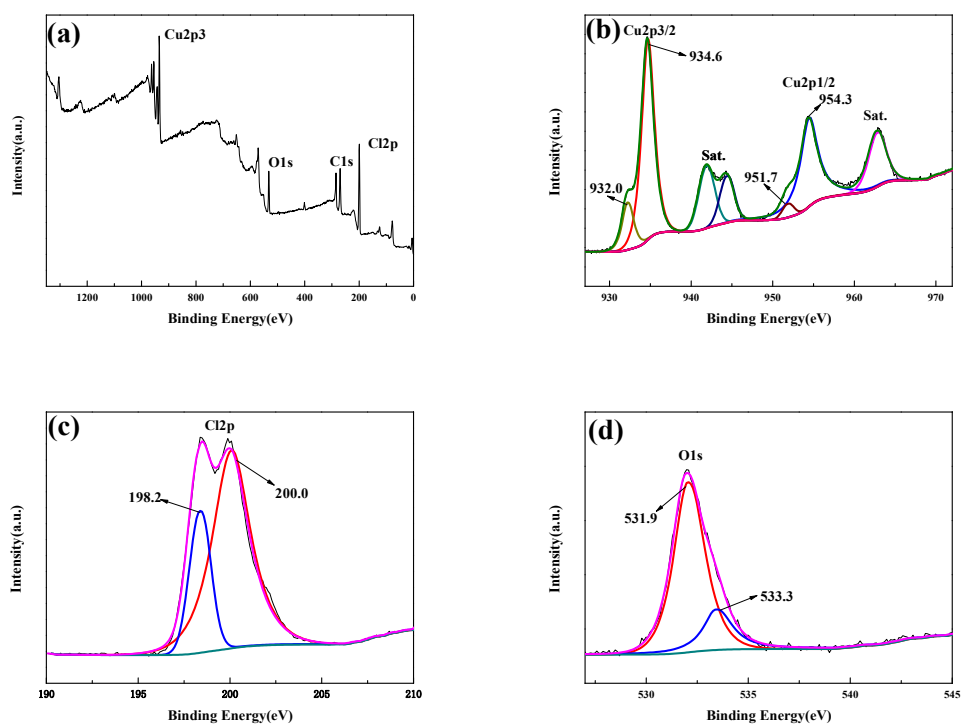
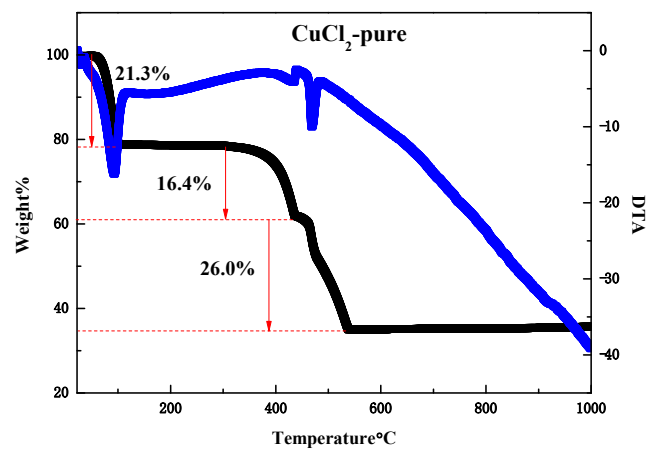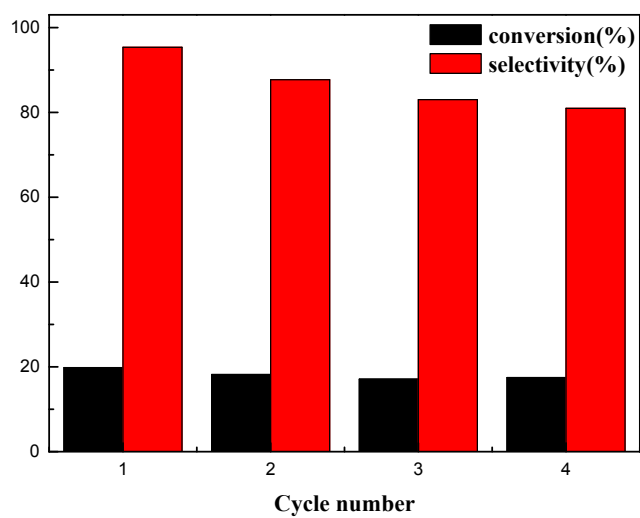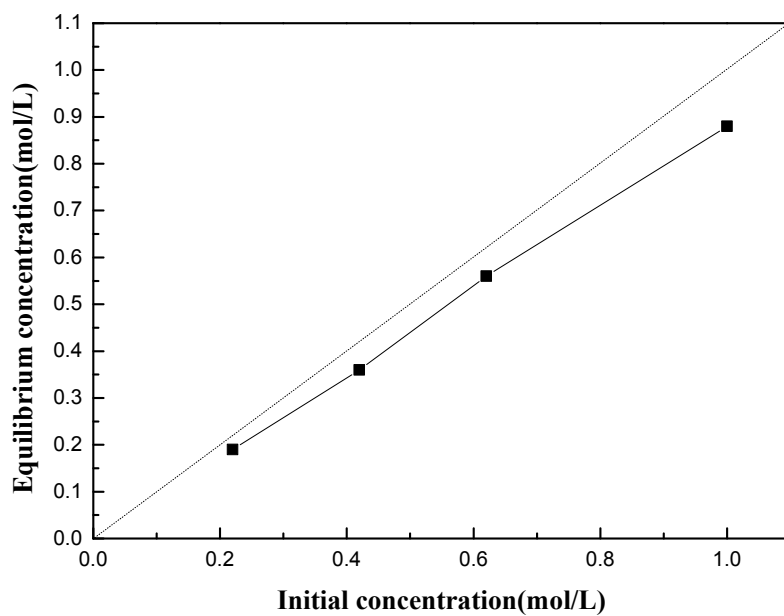**Figure S1 XPS spectra of CuCl$_2$-pure**

Figure S2 TG-DTA analysis of CuCl₂-pure and CuCl₂-DBD

Figure S3 Effect of reused catalyst on hydroxylation of benzene to phenol
Reaction conditions: catalyst 10mg, benzene 1mL, CH₃CN 5mL, 30% H₂O₂ 2mL, 65℃, 4h

Figure S4 The relationship between initial and equilibrium concentrations of benzene on CuCl₂-DBD

Table S2 Effect of CuCl₂-pure and CuCl₂-DBD on hydroxylation of benzene to phenol

Catalyst	Solubility	Benzene conversion[%]	Phenol yield[%]	Phenol selectivity[%]
CuCl$_2$-pure	dissolve in acetonitrile	19.7	15.1	77.1
CuCl$_2$-DBD	insoluble in acetonitrile	20.0	19.1	95.6

Reaction conditions: catalyst 10mg, benzene 1mL, CH$_3$CN 5mL, 30% H$_2$O$_2$ 2mL, 65℃, 4h

Table S3 CuCl₂-DBD and CuCl₂-pure in different temperature for H₂O₂ decomposition

Temperature (℃)	CuCl$_2$-pure		CuCl$_2$-DBD	
	Fitting rate equation	R^2	Fitting rate equation	R^2
50	Ln(V∞-Vt)=-1.518t+12.82	0.9941	Ln(V∞-Vt)=-0.0078t+2.81	0.9869
55	Ln(V∞-Vt)=-2.716t+18.47	0.9873	Ln(V∞-Vt)=-0.018t+2.29	0.9870
60	Ln(V∞-Vt)=-3.649t+15.79	0.9844	Ln(V∞-Vt)=-0.038t+2.54	0.9800
65	Ln(V∞-Vt)=-4.478t+11.14	0.9947	Ln(V∞-Vt)=-0.081t+2.44	0.9814

Reaction condition: 2mg catalyst / 5mLCH$_3$CN / 1mLH$_2$O$_2$ (30%)