Supplementary Materials

Table S1. The experimental factors and limits of the RSM design.

No.	$NaHCO_3$ (g/L)	Catalyst (g/L)	H_2O_2 (mol/L)	Reaction time (min)	Removal ratio (%)
1	3	0.2	0.02	30	71.72%
2	2	0.3	0.03	40	88.57%
3	3	0.2	0.04	30	78.46%
4	2	0.3	0.03	40	92.32%
5	1	0.4	0.02	50	86.45%
6	3	0.4	0.04	50	85.83%
7	1	0.2	0.02	50	86.40%
8	2	0.3	0.03	20	77.83%
9	2	0.3	0.01	40	82.79%
10	2	0.3	0.03	60	91.55%
11	1	0.4	0.02	30	82.31%
12	3	0.4	0.02	30	77.79%
13	2	0.1	0.03	40	81.06%
14	2	0.3	0.03	40	91.69%
15	3	0.2	0.04	50	86.60%
16	4	0.3	0.03	40	72.98%
17	1	0.2	0.04	30	90.01%
18	1	0.2	0.02	30	81.54%
19	3	0.2	0.02	50	85.54%
20	2	0.5	0.03	40	89.38%
21	1	0.2	0.04	50	94.58%
22	3	0.4	0.04	30	85.14%
23	1	0.4	0.04	50	91.12%
24	2	0.3	0.03	40	91.36%
25	2	0.3	0.03	40	91.41%
26	2	0.3	0.05	40	91.50%
27	0	0.3	0.03	40	9.74%
28	2	0.3	0.03	40	90.64%
29	3	0.4	0.02	50	88.78%
30	1	0.4	0.04	30	88.37%

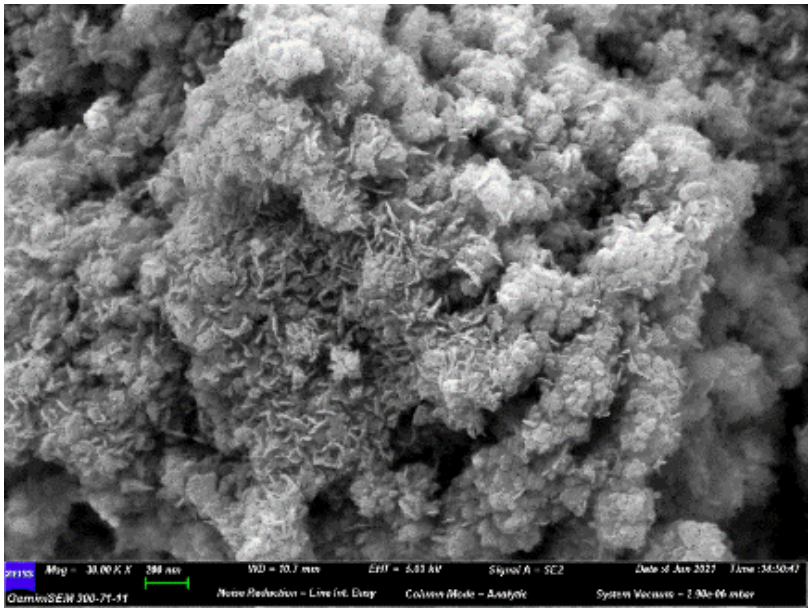

Fig. S1. SEM image of Co/Cu/zeolite after reaction.

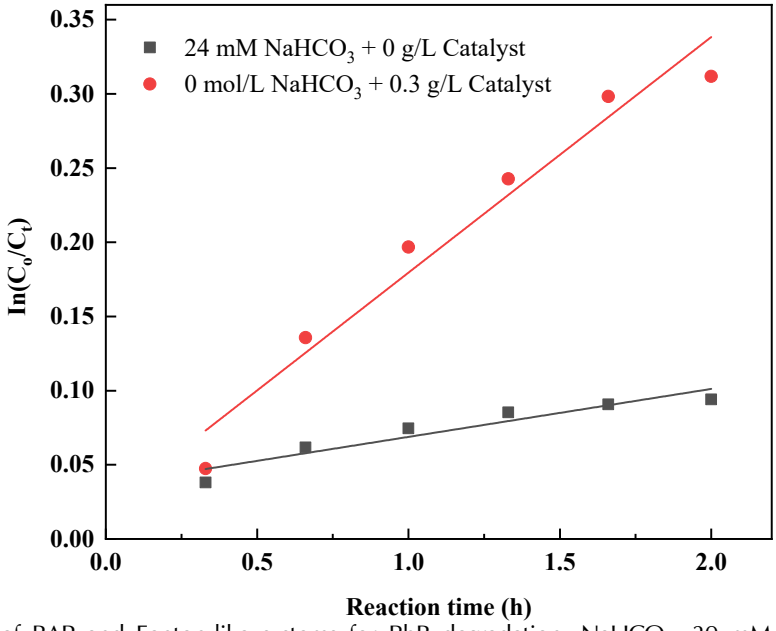

Fig. S2. The reaction rate of BAP and Fenton-like systems for RhB degradation, $NaHCO_3$: 30 mM, H_2O_2: 20 mM, Co/Cu/zeolite: 0.2 g/L, reaction time: 2 h.

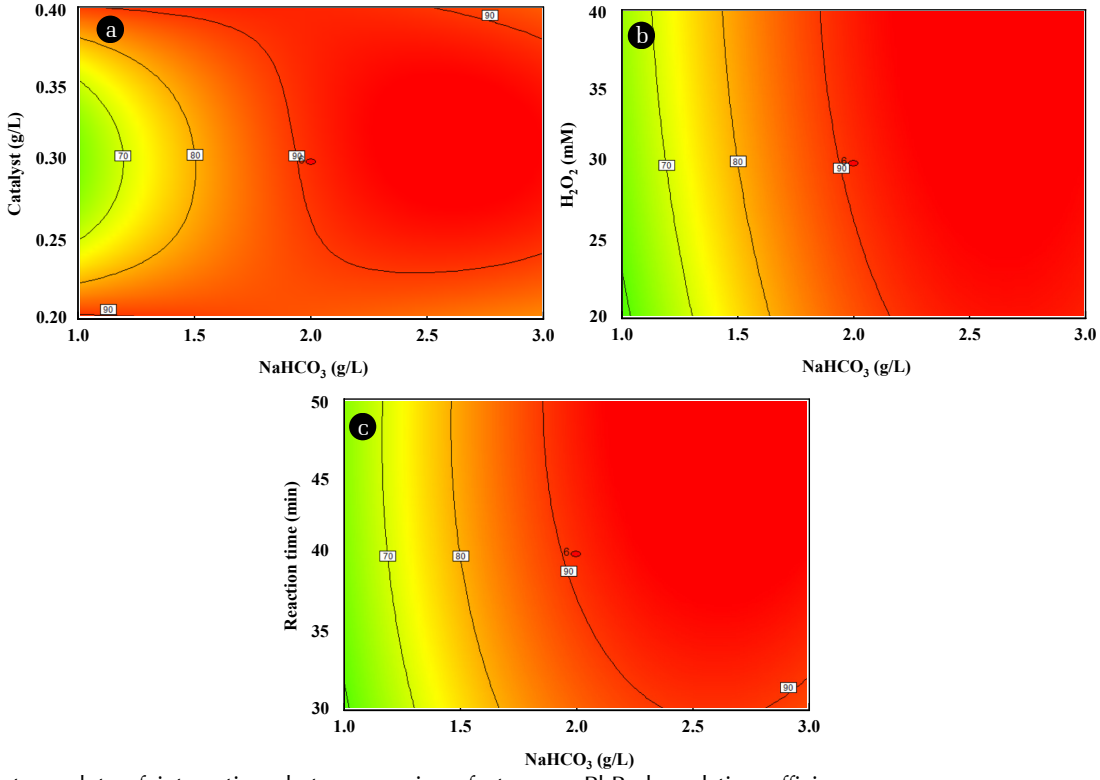

Fig. S3. Contour plots of interactions between various factors on RhB degradation efficiency.

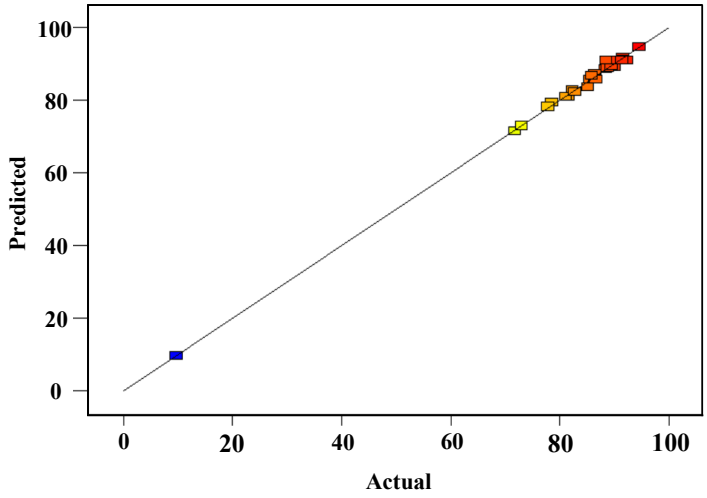

Fig. S4. The comparison between the actual results and predicted degradation efficiency by RSM.

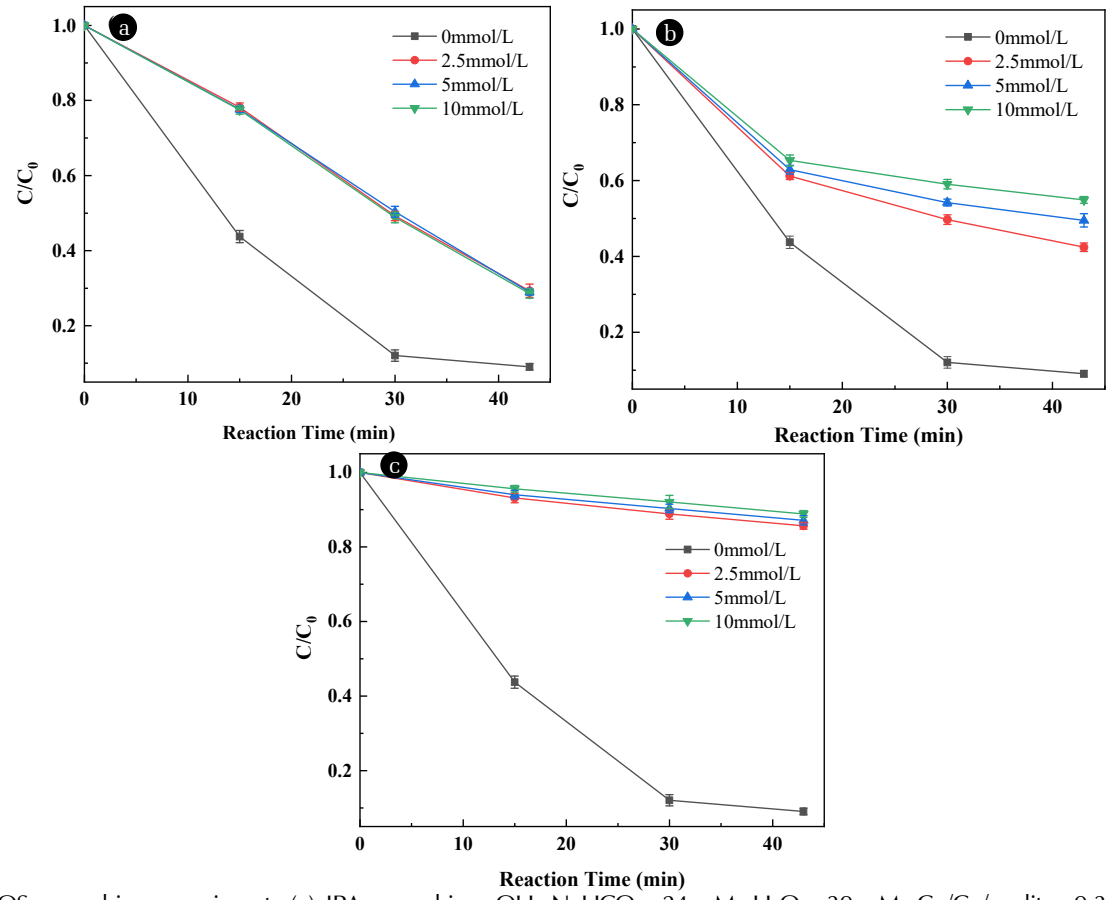

Fig. S5. ROS quenching experiment: (a) IPA quenching ·OH, $NaHCO_3$: 24 mM, H_2O_2: 30 mM, Co/Cu/zeolite: 0.3 g/L, (b) BQ quenching $O_2^{\cdot-}$, $NaHCO_3$: 24 mM, H_2O_2: 30 mM, Co/Cu/zeolite: 0.3 g/L, (c) DABCO quenching $^1O_2$, $NaHCO_3$: 24 mM, H_2O_2: 30 mM, Co/Cu/zeolite: 0.3 g/L.

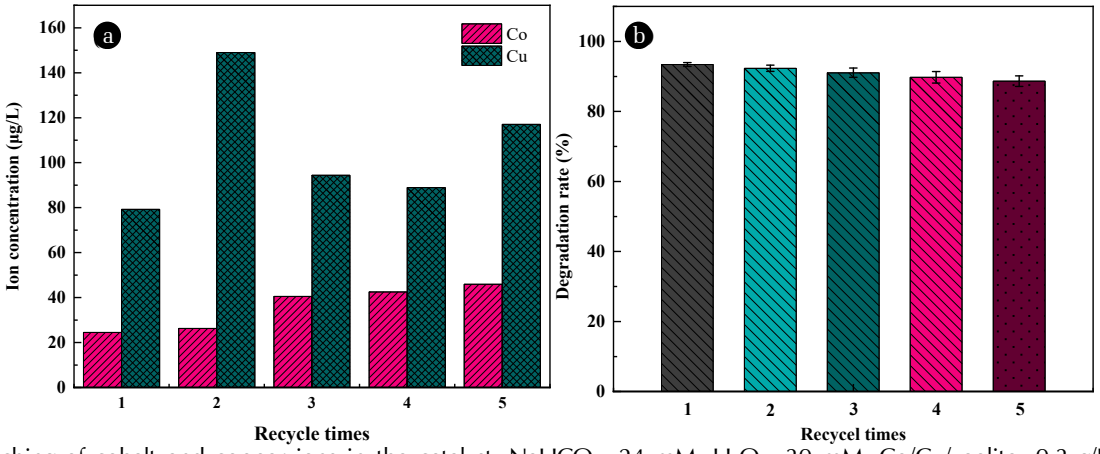

Fig. S6. Leaching of cobalt and copper ions in the catalyst, $NaHCO_3$: 24 mM, H_2O_2: 30 mM, Co/Cu/zeolite: 0.3 g/L (a); Effect of recycle times on the performance of Co/Cu/zeolite heterogeneous catalyst, $NaHCO_3$: 24 mM, H_2O_2: 30 mM, Co/Cu/zeolite: 0.3 g/L (b).