

Table S1 Response surface experiment results based on the Box-Behnken design for the average recovery (*Y*) and three variables (*A-C*).

Run	Independent variables			Response
	A pH	B sorbent (mg)	C time (min)	Y Average recovery (%)
1	5	20	6	95.9745
2	5	10	3	77.7
3	3	30	6	59.1
4	7	10	6	77.3
5	5	10	9	77.3
6	7	30	6	86.3
7	5	20	6	94.5
8	3	20	9	63.6
9	5	30	3	80.1
10	5	20	6	94.73
11	7	20	9	87.2
12	7	20	3	81.2
13	3	20	3	60.521
14	3	10	6	62.2599
15	5	30	9	80.1
16	5	20	6	92.799
17	5	20	6	94.371

Table S2 Analytical results for certified reference materials (n=3)

Certified Reference Material	Elements	Certified	Found	t-test ^b
GSBZ50009-88 ($\mu\text{g mL}^{-1}$)	Cr	0.276	0.282 \pm 0.015 ^a	0.69
	Pb	0.882	0.875 \pm 0.051	0.24
GBW10043 ($\mu\text{g g}^{-1}$)	Cr	0.140	0.136 \pm 0.010	0.69
	Pb	0.075	0.073 \pm 0.006	0.58

^a $t_{0.05,2} = 4.30$

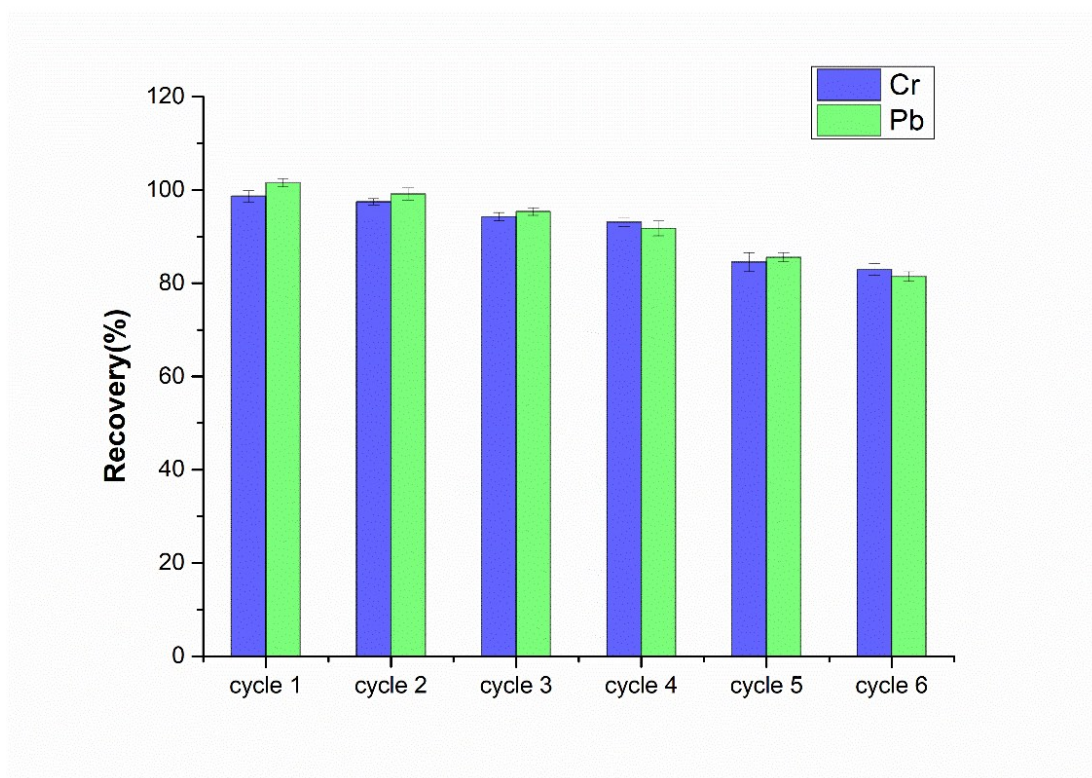


Fig. S1 The effect of reuse of the MGO/SiO₂@PANI-PPy on the recovery % of target metals for six cycles.