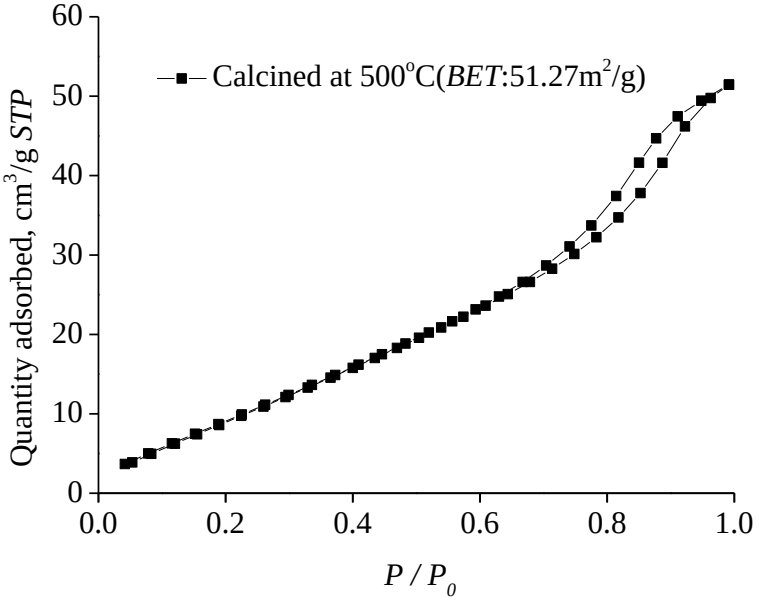
Supplementary

Table SI Different MgO-based adsorbents performance

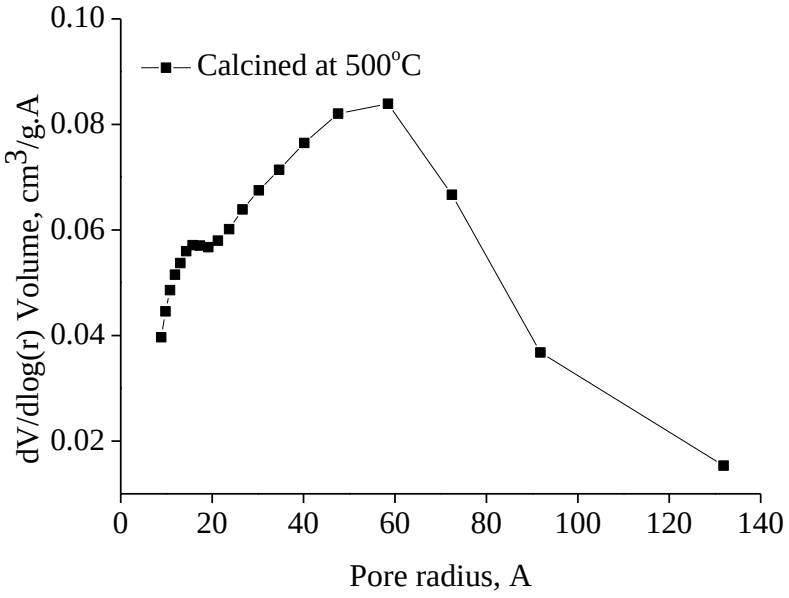
Adsorbents	*Calcination tempterature*, °C	*Calcination time*, h	*Regeneration temperature*, °C	*Adsorption temperature*, °C	*Adsorption Capacity*, mmol/g
MgO/Al_2O_3[26]	600	5	120	25	0.73
MgO (solvothermal) [27]	450	6.7	-	-	-
MgO/OMC[28]	900	6	200	25	2.04
MgO/ CMK-3[29]	800	8.8	800	25	1.81
MgO(solvothermal) [30]	550	22	160-840	90	0.36
Foam magnesia[31]	600	12	30-600	100	2.61
MgO/Al-SBA[32]	450	7.8	100	25	1.36
MgO[33]	400	8.6	-	50	0.81
MgO/k-SBA[34]	540	17	300	20	0.91
MgO[35]	400	5.3	-	50	1.59
MG-480-42-13.8[36]	480	0.7	-	60	0.77
MgO/BM2.5h[37]	323	0.5	850	25	1.61
MgO/Al_2O_3-0.2[38]	400	1	450	60	2.1
Calcinated magnesite (This work)	550	4	550	60	3.01

Table SII The XRF results of calcined magnesite slag at 500 ºC for 5 h

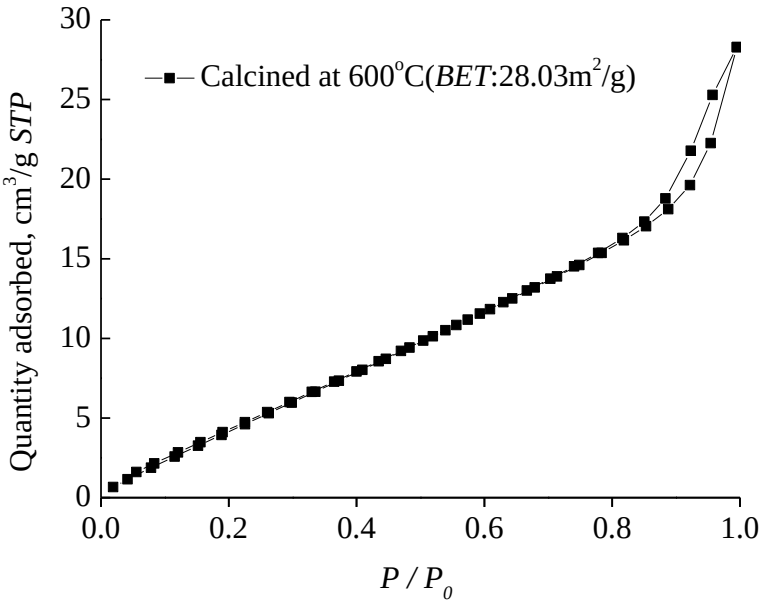
Element / Content/%	Mg	Si	Mn	Ca	Fe	Al
	32.18	11.09	3.18	1.51	1.19	3.82



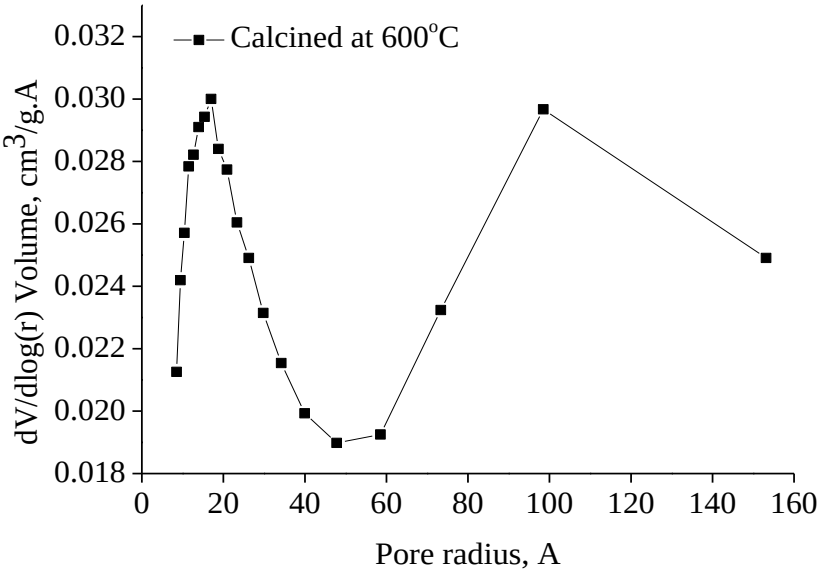
(a)



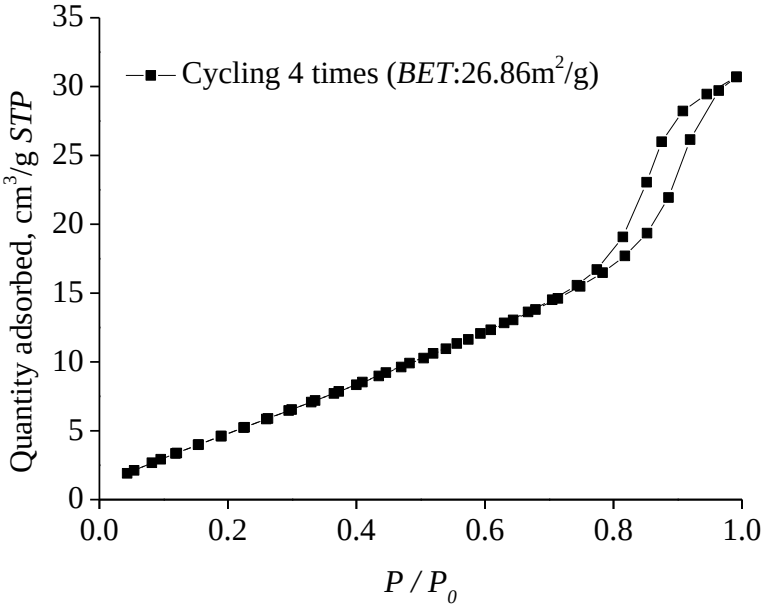
(b)


Calcined at 600°C(BET:28.03m²/g)
Quantity adsorbed, cm³/g STP
P / P0
0
5
10
15
20
25
30
0.0
0.2
0.4
0.6
0.8
1.0

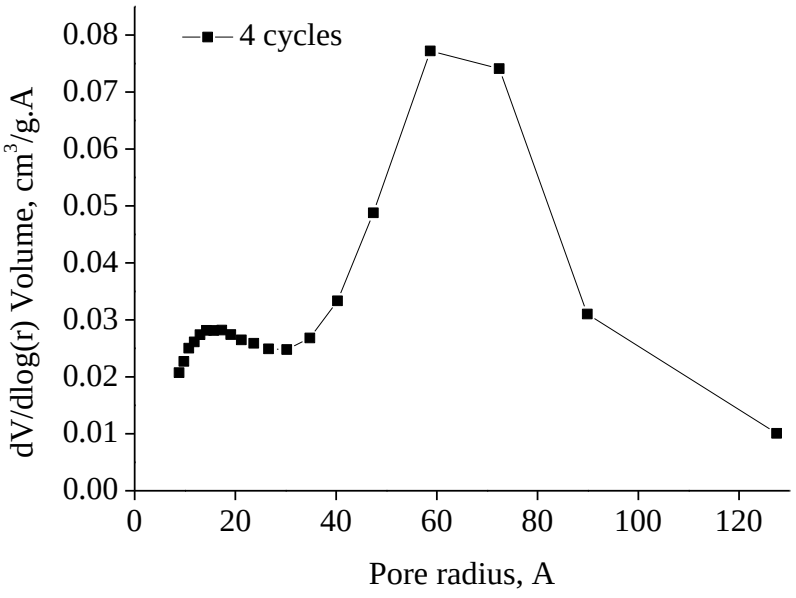
(c)


Calcined at 600°C
dV/dlog(r) Volume, cm³/g.A
Pore radius, A
0.018
0.020
0.022
0.024
0.026
0.028
0.030
0.032
0
20
40
60
80
100
120
140
160

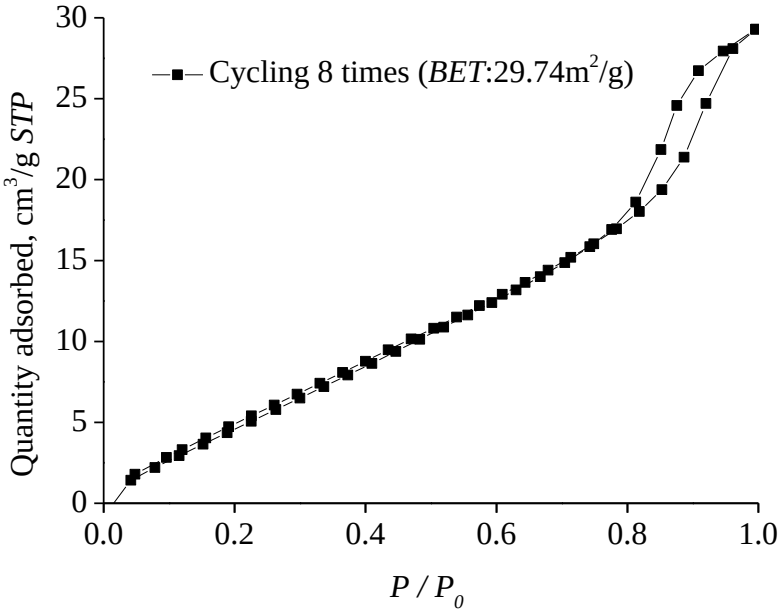
(d)


Cycling 4 times (*BET*:26.86m^2/g)
Quantity adsorbed, cm^3/g *STP*
P / P$_0$
0
5
10
15
20
25
30
35
0.0
0.2
0.4
0.6
0.8
1.0

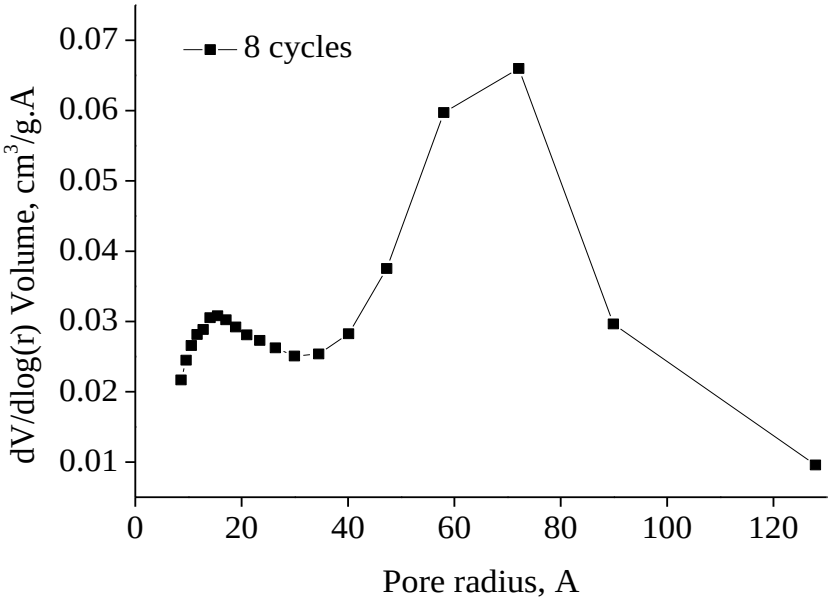
(e)


4 cycles
dV/dlog(r) Volume, cm^3/g.A
Pore radius, A
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0
20
40
60
80
100
120

(f)



(g)



(h)

Figure S1 N_2 adsorption-desorption isotherms (a, c, e, g) and pore size distributions (b, d, f, h) of magnesite slag calcined at 500 ºC for 5 h, 600 ºC for 5 h, after 4 cycles and after 8 cycles (P / P_0: relative pressure; *STP*: standard temperature and pressure)