Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting information

High molecular weight polyethylenimine encapsulated into porous polymer monolithic by one-step polymerization for CO_2 capture

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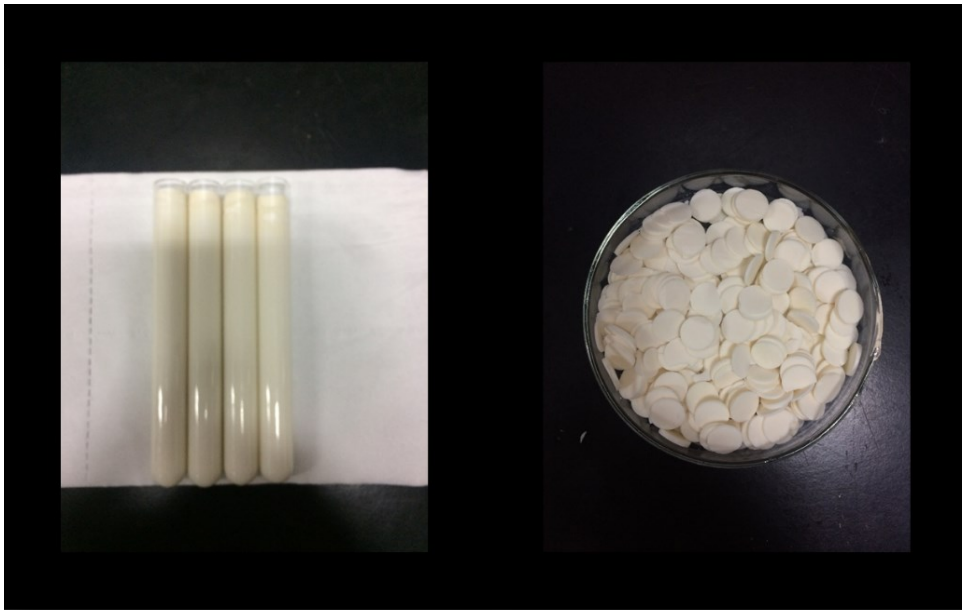

Figure S1. 4.0gPEI70K@polyHIPE monolithic columns and regular pellet samples

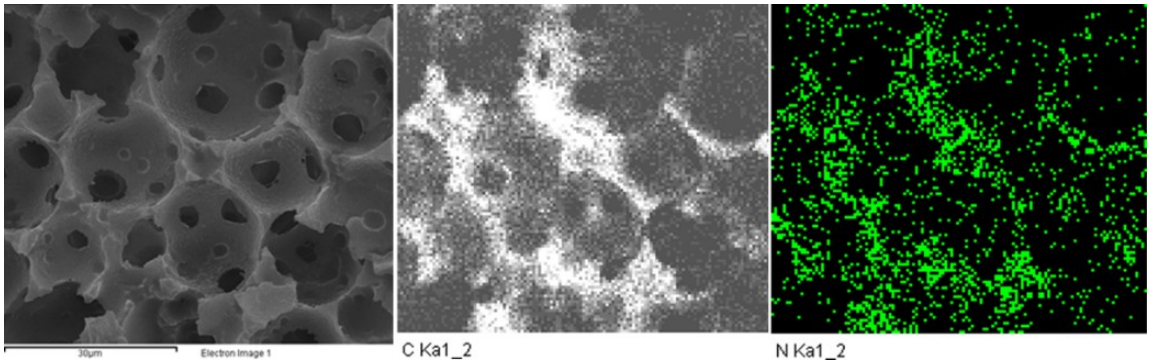

Figure S2. SEM and EDS of the sample 4.0PEI70k@polyHIPE

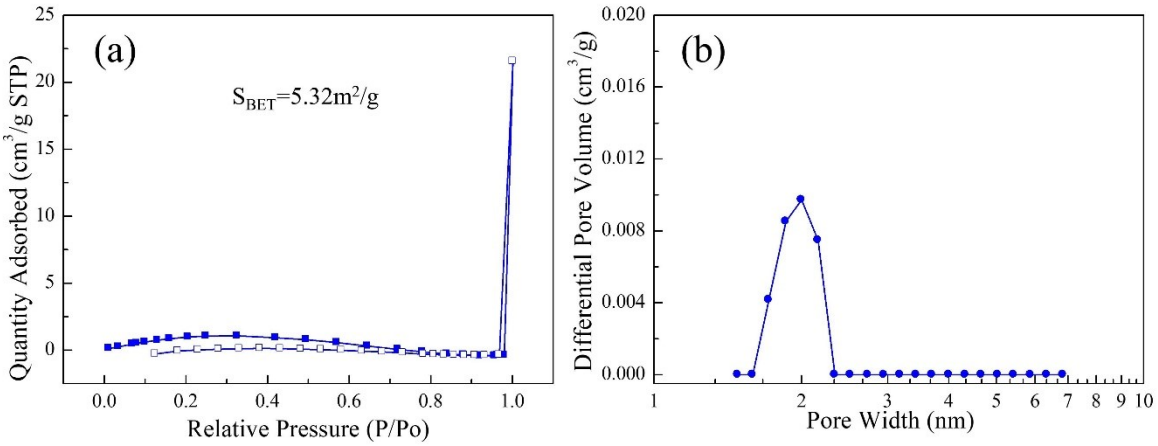

Figure S3. N_2 adsorption-desorption isotherms (a) and pore size distributions (b) of polyHIPE-50%PEI70K.

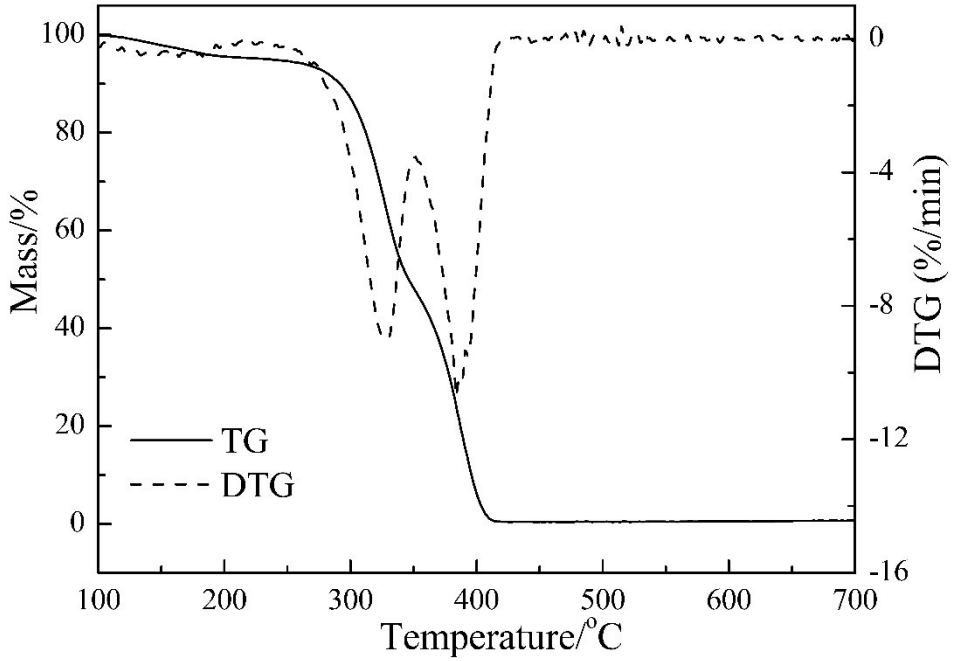

Figure S4. TG and DTG curves of pure PEI70K.

Table S1. Emulsions compositions.

Sample	Continuous phase				Aqueous phase		
	St[g]	DVB[g]	Span 80[g]	AIBME[g]	H_2O[mL]	NaCl[g]	PEI*[g]
polyHIPE	2.00	2.50	1.00	0.10	26.50	0.55	0.00
0.5PEI70K@polyHIPE	2.00	2.50	1.00	0.10	26.00	0.55	1.00

1.0PEI70K@polyHIPE	2.00	2.50	1.00	0.10	25.50	0.55	2.00
2.0PEI70K@polyHIPE	2.00	2.50	1.00	0.10	24.50	0.55	4.00
4.0PEI70K@polyHIPE	2.00	2.50	1.00	0.10	22.50	0.55	8.00
8.0PEI70K@polyHIPE	2.00	2.50	1.00	0.10	18.50	0.55	16.00

* 50%wt aqueous solution of PEI70K

Table S2. Comparison of the CO_2 Adsorption Capacities of Adsorbents

Samples	amine	temperature (°C)	CO_2 concentration	adsorption capacities (mmol/g)	Amine efficiency (molCO_2/molN)	reference
4.0gPEI70K @polyHIPE	PEI70K	20	10%	4.18(wet)	0.46	This work
		60		2.35(dry)	0.26	
polyHIPE-50%PEI70K	PEI70K	60	10%	2.09(dry)	0.21	This work
Monolithic Alumina	PEI800	30	400ppm	0.75(dry)	-	[1]
MCM-41	PEI600	75	15%	2.02(dry)	0.17	[2]
				2.97(wet)	0.2	
MCM-41	TEPA	35	10%	2.70(dry)	0.21	[3]
	PEI600			1.60(dry)	0.13	
	PEI1800			1.30(dry)	0.11	
PMMA	PEI423	45	10%	2.40(dry)	0.32	[4]
				3.53(wet)	0.47	
porous silica monoliths	PEI600	75	100%	2.44(dry)	0.21	[5]

		25		1.00(dry)	0.09	
Nanoporous carbon	PEI600	75	100%	1.01(dry)	0.13	[6]
			10%	0.23(dry)	0.03	
AC	MDEA	50	20%	0.58(dry)	0.26	[7]
				1.70(wet)	0.76	
PAF-5	PEI800	40	15%	2.52	0.19	[8]
SBA-15	TEPA	75	100%	3.93(dry)	0.3	[9]
SBA-15	PEI423	75	15%	2.38(dry)	0.21	[10]
ZSM-5	TEPA	100	10%	1.49(dry)	0.29	[11]
ZSM-5	PEI	120	100%	1.80(dry)	-	[12]
MIL-101	TEPA	25	100%	3.5(dry)	0.38	[13]
ZIF-8	PEI	65	50%	1.99(wet)	-	[14]
ZIF-8	PEI800	25	100%	0.90(dry)	0.05	[15]
				0.90(wet)		
γ-alumina	PEI600	25	10%	1.73(dry)	0.20	[16]
			400ppm	1.33(dry)	0.15	
PD-M	PEI	25	10%	1.21(dry)	0.09	[17]
				1.96(wet)	0.15	

Table S3. CO_2 Adsorption capacities of 4.0PEIy@polyHIPE under 10% CO_2 in N_2 at 60 °C in fixed bed.

Sample	C/%	H/%	N/%	CO_2 adsorption capacity (mmol/g)
4.0PEI600@polyHIPE	55.28	9.45	11.77	2.16
4.0PEI1800@polyHIPE	57.65	9.87	12.80	2.26
4.0PEI10K@polyHIPE	58.72	9.59	11.23	2.17

4.0PEI70K@polyHIPE	60.80	8.86	12.72	2.35

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