

Supporting Information

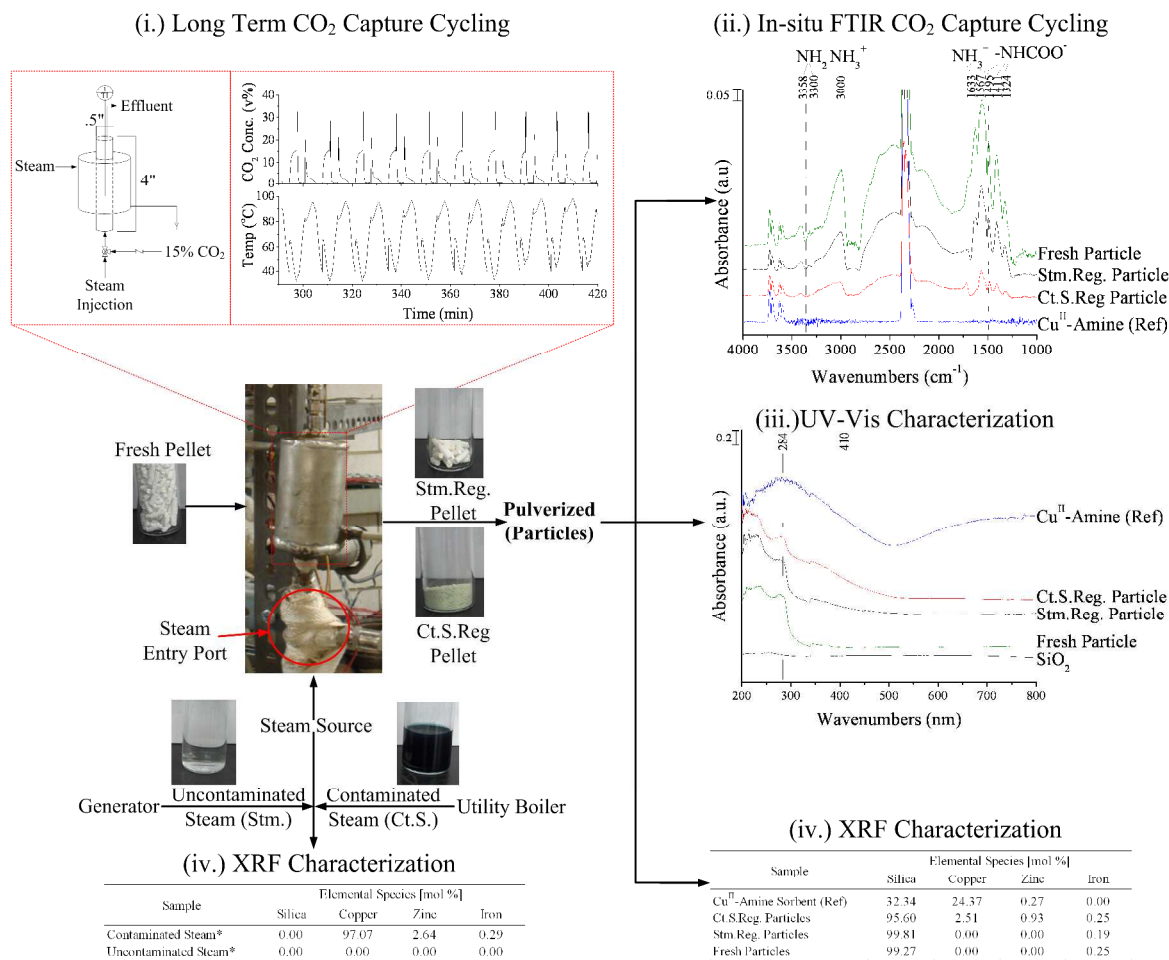


Figure S.1. Graphical outline of experimental details.

Table S.1. CO₂ capture capacity of the steam and contaminated steam regenerated particles as a function of cycle number.

Cycle	Cycle Number/Working Capture Capacity (mmol _{CO2} /g _{Sorb})		Cycle	Cycle Number/Working Capture Capacity (mmol _{CO2} /g _{Sorb})	
	Stm.Reg. Particles	Ct.S.Reg. Particles		Stm.Reg. Particles	Ct.S.Reg. Particles ^[b]
Initial ^[a]	2.75	2.75	16	2.47	-
1	1.92	1.92	17	2.26	-
2	1.84	2.02	18	2.02	-

3	1.97	0.98	19	2.16	-
4	1.98	0.53	20	2.28	-
5	1.99	1.42	21	2.21	-
6	1.98	0.37	22	2.29	-
7	2.03	0.02	23	2.25	
8	1.56	0.37	24	2.25	-
9	1.68	0.41	25	2.25	-
10	1.67	0.31	26	1.76	-
11	1.69	0.36	27	1.85	-
12	1.68	0.34	28	2.21	-
13	2.14	0.34	29	1.72	-
14	2.18	0.28	Final ^[a]	1.49	0.25
15	2.28	0.28			

[a] CO₂ capture capacities calculated by a weight change method similar to TGA determination

[b] The CO₂ capture capacity of the contaminated steam regenerated particle could not be calculated for cycles 16-29 because of an error occurring in the CO₂ gas sensor.

Table S.2. XRF analysis of fresh particles, steam regenerated particles, reference particles and condensed steam samples.

Sample	Elemental Species [mol %]			
	Silica	Copper	Zinc	Iron
Contaminated Stm ^[a]	0.00	97.07	2.64	0.29
Uncontaminated Stm ^[a]	0.00	0.00	0.00	0.00
Cu ^{II} -Amine (Ref)	32.34	24.37	0.27	0.00
Ct.S.Reg Particles ^[b]	95.60	2.51	0.93	0.25
Stm.Reg Particles ^[c]	99.81	0.00	0.00	0.19
Fresh Particles	99.27	0.00	0.00	0.25

[a] Condensed liquid samples

[b] Contaminated steam regenerated

[c] Steam regenerated

Table S.3. Summary of Cu^{II} adsorption capacities of various amine based adsorbents reported in literature.

Amine	Support	C _o (mg/L)	T _{ads} (°C)	t _{ads} (min)	q _{max} (mg g ⁻¹)	Cu/N ^[a]	Ref
N-propylsalicylaldimine	Porous Silica	0.25	RT	30			30
TEPA	Fe ₃ O ₄ Nano Particles	10 - 500	35	90	116.28		14
APTES, MDA	SBA-15	50			38.00		35
APTS	SBA-15	5 - 320	20 - 60	240	34.32 - 83.89	0.93 – 2.27	20
APTES, SA	SBA-15, Silica Gel	127 - 381	RT	30	58.47	0.42	19
TETA, TEPA	Polymeric	254 - 636	37	240	63.44, 58.48	0.71, 0.79	29

	microspheres						
EDA, DETA, TETA, TEPA	PGMA beads	25 - 254	RT	360-420	63.55 - 73.72		26
TPED	SiO ₂ /Fe ₃ O ₄	50-150	25-55	1440	2.38-9.02		9
PEI	nanofibrous membranes	100	RT	1440	67.16		36
DETA	Polyacrylonitrile fibers	10 - 300	25	180	31.45		37
DETA	PGMA microgranules	10 - 317	RT	240	95.33		38
NH ₂ -Functionalized	Activated Carbon	32	25	120	54.35		39
APTMS	Bentonite	25 - 100	-	300	12.1 - 34.0		40
APTES, AEAPMDMS, TMSPD	MCM-41	10	20	2880	43.96		41
ETA							
TEPA	SiO ₂		100	5	9.57	0.02	Present Work

[a] Estimated from the data available

References

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