

Appendix A

Table A1. Mass and energy balance for the new flowsheet based on feed composition used in Jin et al.[9].

Stream no.	S1 [9]	S2	S3	S4	S5	S6
Composition Mole%						
CO ₂	82.40	82.40	82.40	82.40	82.40	82.40
O ₂	4.19	4.19	4.19	4.19	4.19	4.19
N ₂	9.50	9.50	9.50	9.50	9.50	9.50
Ar	3.90	3.90	3.90	3.90	3.90	3.90
CO (ppm)	31	31	31	31	31	31
SO ₂ (ppm)	14	14	14	14	14	14
SO ₃ (ppb)	83	83	83	83	83	83
NO (ppm)	20	20	20	20	20	20
NO ₂ (ppb)	38	38	38	38	38	38
Flowrate, kg/hr	717.2	717.2	717.2	717.2	717.2	717.2
Temperature, °C	50.0	199.8	25.0	204.7	80.0	-35.0
Pressure, Bar	1.10	5.90	5.55	29.0	28.65	28.44
Stream no.	S7	S8	S9	S10	S11	S12
Composition Mole%						
CO ₂	48.81	48.81	25.67	25.67	25.67	25.67
O ₂	11.92	11.92	17.21	17.21	17.21	17.21
N ₂	28.05	28.05	40.88	40.88	40.88	40.88
Ar	11.21	11.21	16.24	16.24	16.24	16.24
CO (ppm)	91.57	91.57	133.41	133.41	133.41	133.41
SO ₂ (ppm)	1.12	1.12	0.07	0.07	0.07	0.07
SO ₃ (ppb)	0.46	0.46	Trace	Trace	Trace	Trace
NO (ppm)	53.06	53.06	74.17	74.17	74.17	74.17
NO ₂ (ppb)	0.52	0.52	Trace	Trace	Trace	Trace
Flowrate, kg/hr	194.3	194.3	120.2	120.2	120.2	120.2
Temperature, °C	-35.0	-54.0	-54.0	75.0	100.0	-39.3
Pressure, Bar	28.44	28.23	28.23	28.02	28.68	2.21
Stream no.	S13	S14	S15	S16	S17	S18
Composition Mole%						
CO ₂	25.67	96.88	96.88	96.88	96.88	96.88
O ₂	17.21	0.86	0.86	0.86	0.86	0.86
N ₂	40.88	1.51	1.51	1.51	1.51	1.51
Ar	16.24	0.75	0.75	0.75	0.75	0.75

CO (ppm)	133.41	4.91	4.91	4.91	4.91	4.91
SO ₂ (ppm)	0.07	19.55	19.55	19.55	19.55	19.55
SO ₃ (ppb)	Trace	118.57	118.57	118.57	118.57	118.57
NO (ppm)	74.17	5.76	5.76	5.76	5.76	5.76
NO ₂ (ppb)	Trace	54.15	54.15	54.15	54.15	54.15
Flowrate, kg/hr	120.2	522.9	522.9	522.9	522.9	522.9
Temperature, °C	28.0	-35.0	-55.0	52.2	166.3	25.0
Pressure, Bar	2.0	28.44	6.97	6.76	20.0	19.65
Stream no.	S19	S20	S21	S22	S23	S24
Composition Mole%						
CO ₂	96.88	95.88	95.88	95.88	95.88	95.88
O ₂	0.86	1.16	1.16	1.16	1.16	1.16
N ₂	1.51	1.96	1.96	1.96	1.96	1.96
Ar	0.75	0.99	0.99	0.99	0.99	0.99
CO (ppm)	4.91	6.47	6.47	6.47	6.47	6.47
SO ₂ (ppm)	19.55	3.27	3.27	3.27	3.27	3.27
SO ₃ (ppb)	118.57	1.38	1.38	1.38	1.38	1.38
NO (ppm)	5.76	10.11	10.11	10.11	10.11	10.11
NO ₂ (ppb)	54.15	1.57	1.57	1.57	1.57	1.57
Flowrate, kg/hr	522.9	74.0	74.0	74.0	74.0	74.0
Temperature, °C	192.4	-54.0	-35.0	-55.0	50.0	158.0
Pressure, Bar	97.0	28.23	28.02	7.35	7.14	20.0
Stream no.	S25	S26	CO2			
Composition Mole%						
CO ₂	95.88	95.88	96.75			
O ₂	1.16	1.16	0.90			
N ₂	1.96	1.96	1.56			
Ar	0.99	0.99	0.78			
CO (ppm)	6.47	6.47	5.10			
SO ₂ (ppm)	3.27	3.27	17.52			
SO ₃ (ppb)	1.38	1.38	104.0			
NO (ppm)	10.11	10.11	6.30			
NO ₂ (ppb)	1.57	1.57	47.61			
Flowrate, kg/hr	74.0	74.0	596.9			
Temperature, °C	25.0	192.9	192.4			
Pressure, Bar	19.65	97.0	97.0			