

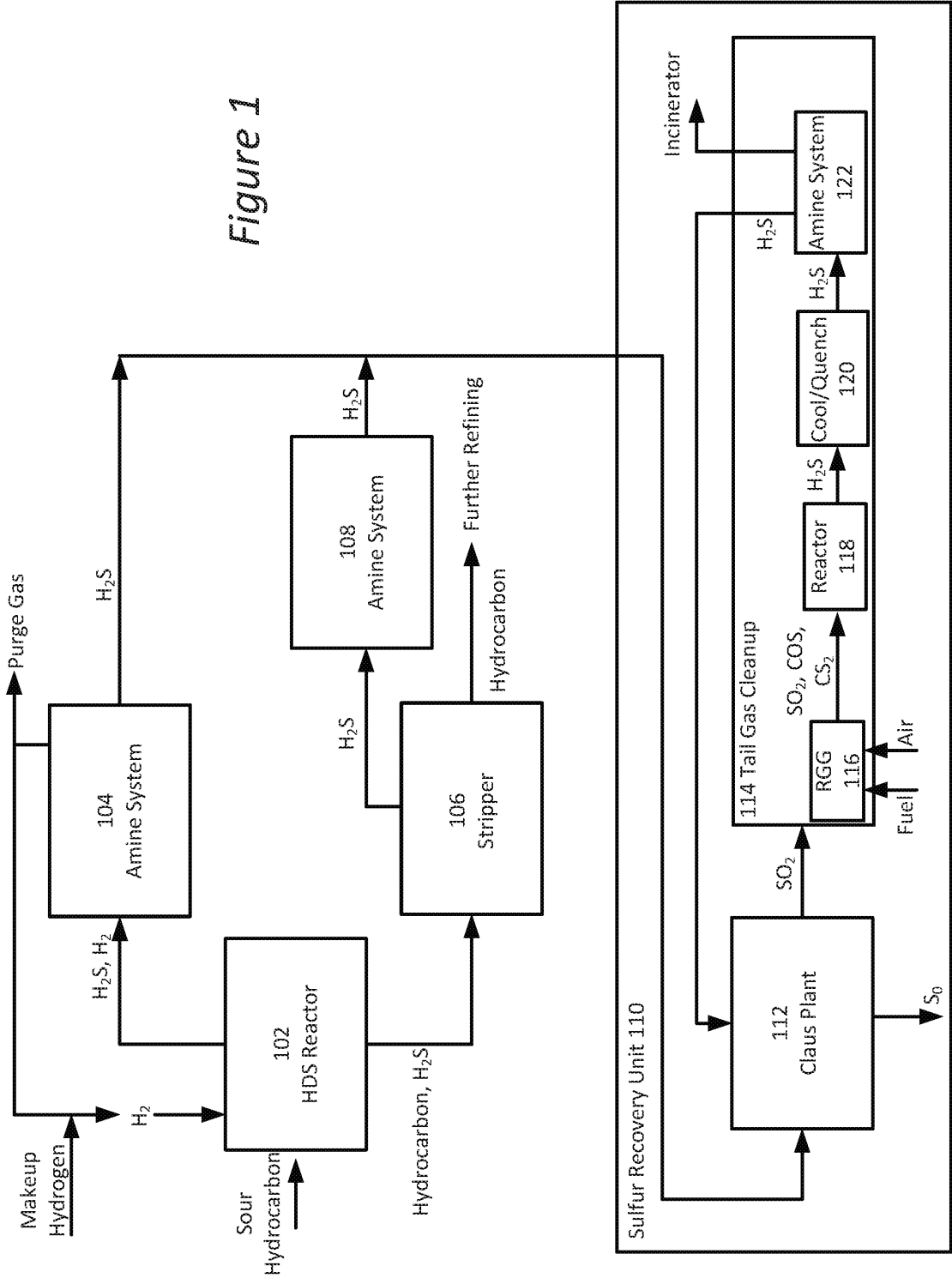


Table 1: Physical Property Analysis of Catalyst Post Regeneration, Solvent Extraction, and Hot Nitrogen Stripping

Catalyst Form:		Regenerated/Rejuvenated				Solvent Extracted	Hot N2 Stripped
Catalyst Name	Catalyst A	Catalyst B	Catalyst C - Application 1	Catalyst C - Application 2	Catalyst D	Catalyst E	Catalyst F
Average Carbon, wt%	0.55	0.47	0.67	0.02	0.44	0.10	11.29
Average Sulfur, wt%	0.66	0.40	0.41	0.42	0.53	0.48	12.08
Compacted Bulk Density, g/cc	0.81	0.77	0.76	0.77	0.76	0.77	1.10
Average Length, mm	3.86	3.25	4.00	5.09	3.67	3.92	4.39
Average Diameter, mm	2.74	2.11	2.39	2.38	2.69	2.70	2.69
Nitrogen Surface Area (Sulfate Corr.), m ² /g	208.73	212.08	153.00	170.00	175.00	234.70	72.33
APL/APD (L/D)	0.82	1.19	1.82	2.82	1.36	1.45	1.63
Vanadium, wt%	0.00	0.01	0.02	0.01	0.01	0.01	0.01*
Arsenic, wt%	0.00	0.01	0.02	0.00	0.00	0.06	0.00*
Sodium, wt%	0.07	0.02	0.20	0.10	0.19	0.08	0.05*
Silicon, wt%	0.00	0.03	0.16	0.37	0.04	2.49	0.20*
Iron, wt%	0.00	0.06	0.11	0.03	0.00	0.09	0.01*
Lead, wt%	0.03	0.03	0.03	0.03	0.03	0.01	0.04*
Phosphorus, wt%	1.12	0.05	0.91	1.02	2.22	0.02	3.42*
Calcium, wt%	0.05	0.00	0.02	0.01	0.05	0.11	0.01*
Molybdenum, wt%	14.68	15.09	16.57	16.01	15.86	11.80	19.51*
Nickel, wt%	0.80	0.12	0.13	0.00	3.50	2.16	4.71*
Cobalt, wt%	3.62	3.44	3.39	3.54	0.00	0.01	0.00*
Tungsten, wt%	0.03	0.03	0.05	0.05	0.02	0.01	0.05*

*metals content based on a lab regenerated sample of Catalyst F

Figure 2

Table 2: Performance Test Results at 1,200 GHSV

1,200 GHSV Test Data																
Conversion Type: Temperature:	%SO ₂ Conversion					%CS ₂ Conversion					%COS Conversion					
	300°C	280°C	240°C	220°C	200°C	300°C	280°C	240°C	220°C	200°C	300°C	280°C	240°C	220°C	200°C	
Regenerated Commercial HPC Catalyst A	99.90	99.97	99.95	99.65	99.65	100.00	100.00	100.00	95.00	74.16	97.18	92.82	87.92	75.00		
Excel® Rejuvenated Commercial HPC Catalyst A	99.01	99.97	99.97	99.99	99.99	100.00	100.00	100.00	97.79	82.69	94.10	87.21	74.75	61.84		
Regenerated Commercial HPC Catalyst B	99.89	99.90	99.89	99.58	99.58	100.00	100.00	100.00	100.00	87.43	97.38	96.76	93.59	62.60		
Excel® Rejuvenated Commercial HPC Catalyst B	99.62	99.35	99.60	99.85	99.85	100.00	100.00	100.00	100.00	98.60	96.68	95.30	89.71	81.49		
Fresh Commercial HPC Catalyst C	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	97.72	96.51	92.16	88.79		
Regenerated Commercial HPC Catalyst C - Application 1	99.02	99.03	99.01	98.96	98.96	100.00	100.00	100.00	100.00	100.00	100.00	98.87	97.29	95.77		
Regenerated Commercial HPC Catalyst C - Application 2	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	94.52	98.16	97.78	96.07	93.93		
Regenerated Commercial HPC Catalyst D	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	95.05	100.00	99.67	98.95	97.33		
Excel® Rejuvenated Commercial HPC Catalyst D	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	94.32	91.38	88.92	84.39	72.36		
Regenerated Commercial HPC Catalyst E	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	96.78	95.51	96.56	94.80	89.52	82.23		
Solvent Extracted Commercial HPC Catalyst F	99.84	99.65	96.63	94.51	95.86	95.86	95.08	88.03	80.28	44.47	51.72	44.47	1.44	-46.61		
Hot Nitrogen Stripped Commercial HPC Catalyst F	99.94	96.26	99.15	98.95	95.98	93.74	82.23	67.01	47.52	39.99	-12.73	-63.86				
Fresh Commercial Tailgas Catalyst	99.51	99.50	98.95	98.35	97.51	95.52	87.60	81.16	96.22	93.90	84.90	74.98				

Figure 3

Overall S Conv. =
$$\frac{\left[\left(\text{Feed SO}_2 \text{ (mol\%)} * \text{SO}_2 \text{ Conv. (\%)} * \frac{32 \frac{\text{g}}{\text{mol}} \text{ S}}{64.07 \frac{\text{g}}{\text{mol}} \text{ SO}_2} \right) + \left(\text{Feed CS}_2 \text{ (mol\%)} * \text{CS}_2 \text{ Conv. (\%)} * \frac{64 \frac{\text{g}}{\text{mol}} \text{ S}_2}{76.14 \frac{\text{g}}{\text{mol}} \text{ CS}_2} \right) + \left(\text{Feed COS (mol\%)} * \text{COS Conv. (\%)} * \frac{32 \frac{\text{g}}{\text{mol}} \text{ S}}{60.075 \frac{\text{g}}{\text{mol}} \text{ COS}} \right) \right]}{\left[\left(\text{Feed SO}_2 \text{ (mol\%)} * \frac{32 \frac{\text{g}}{\text{mol}} \text{ S}}{64.07 \frac{\text{g}}{\text{mol}} \text{ SO}_2} \right) + \left(\text{Feed CS}_2 \text{ (mol\%)} * \frac{64 \frac{\text{g}}{\text{mol}} \text{ S}_2}{76.14 \frac{\text{g}}{\text{mol}} \text{ CS}_2} \right) + \left(\text{Feed COS (mol\%)} * \frac{32 \frac{\text{g}}{\text{mol}} \text{ S}}{60.075 \frac{\text{g}}{\text{mol}} \text{ COS}} \right) \right]}$$

Table 3: Overall Sulfur Conversion at 1,200 GHSV

1,200 GHSV Test Data					
Catalyst	Conversion Type:		% Overall Sulfur Conversion		
	Temperature:		300°C	280°C	240°C
Regenerated Commercial HPC Catalyst A			99.49	98.82	96.73
Excel® Rejuvenated Commercial HPC Catalyst A			98.47	97.92	95.34
Regenerated Commercial HPC Catalyst B			99.51	99.42	98.90
Excel® Rejuvenated Commercial HPC Catalyst B			99.24	98.86	98.11
Fresh Commercial HPC Catalyst C			99.64	99.46	98.78
Regenerated Commercial HPC Catalyst C - Application 1			99.43	99.25	99.00
Regenerated Commercial HPC Catalyst C - Application 2			99.70	99.64	99.36
Regenerated Commercial HPC Catalyst D			100.00	99.95	99.83
Excel® Rejuvenated Commercial HPC Catalyst D			98.60	98.21	97.47
Regenerated Commercial HPC Catalyst E			99.46	99.19	97.54
Solvent Extracted Commercial HPC Catalyst F			90.99	89.49	78.93
Hot Nitrogen Stripped Commercial HPC Catalyst F			90.39	86.45	76.62
Fresh Commercial Tailgas Catalyst			98.44	97.53	93.66
					90.00

Figure 4

Table 4: Performance Test Results at 3,000 GHSV

3,000 GHSV Test Data									
Catalyst	Conversion Type: Temperature:	%SO ₂ Conversion		%CS ₂ Conversion		%COS Conversion		%COS Conversion	
		280°C	250°C	220°C	280°C	250°C	220°C	280°C	220°C
Regenerated Commercial HPC Catalyst A		99.82	99.81	92.63	98.78	87.29	39.30	88.90	-35.31
Excel® Rejuvenated Commercial HPC Catalyst A		99.86	97.09	96.15	99.37	88.69	54.75	81.85	-20.66
Regenerated Commercial HPC Catalyst B		99.84	97.82	98.06	100.00	95.39	58.24	89.88	0.81
Excel® Rejuvenated Commercial HPC Catalyst B		99.90	99.94	97.83	100.00	100.00	99.12	89.48	80.07
Fresh Commercial Tailgas Catalyst		99.33	97.83	94.88	78.42	30.86	9.59	61.21	8.86

3,000 GHSV Test Data					
Catalyst	Conversion Type: Temperature:	% Overall Sulfur Conversion			
		280°C	250°C	220°C	
Regenerated Commercial HPC Catalyst A		97.79	91.74	58.23	
Excel® Rejuvenated Commercial HPC Catalyst A		96.83	88.61	66.62	
Regenerated Commercial HPC Catalyst B		98.27	93.65	72.10	
Excel® Rejuvenated Commercial HPC Catalyst B		98.24	97.82	95.30	
Fresh Commercial Tailgas Catalyst		88.24	71.56	61.37	

Figure 5

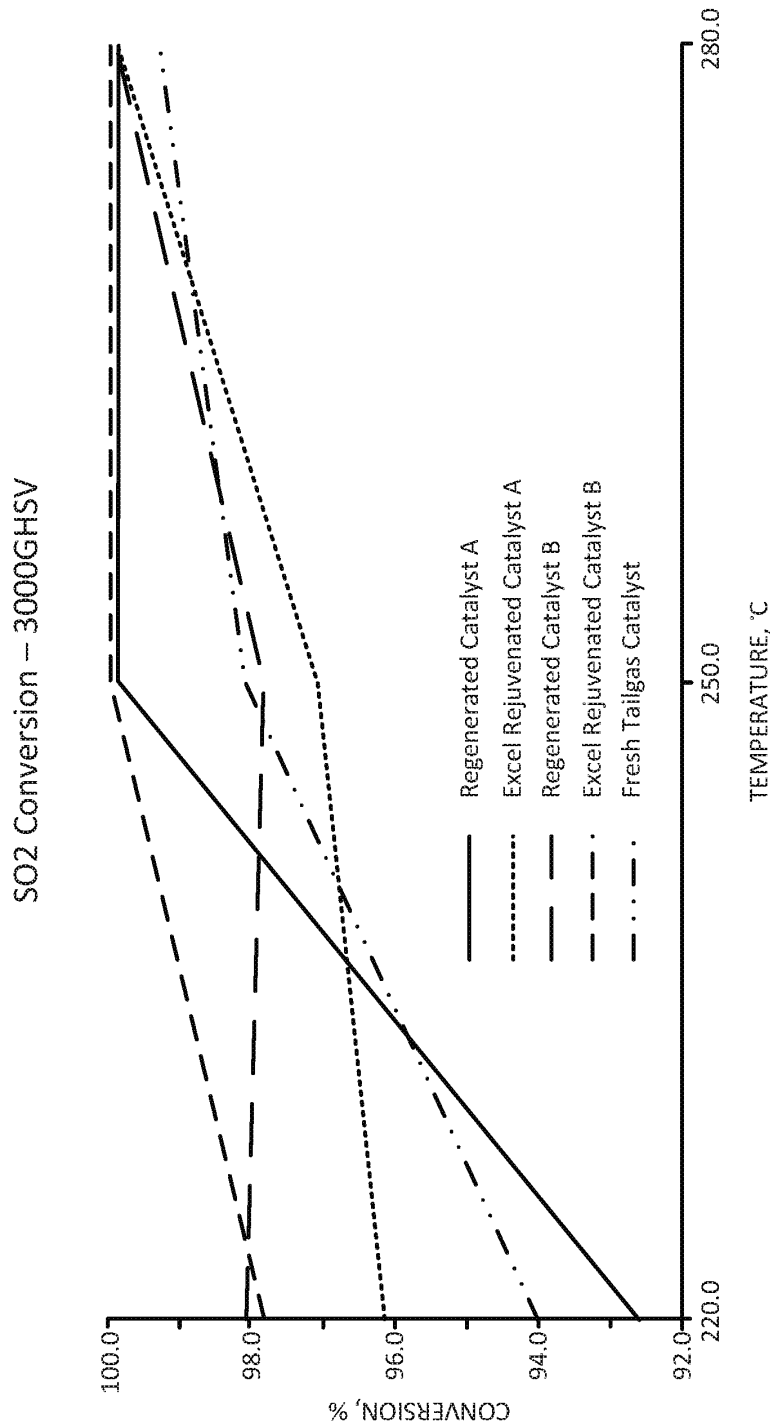


Figure 6

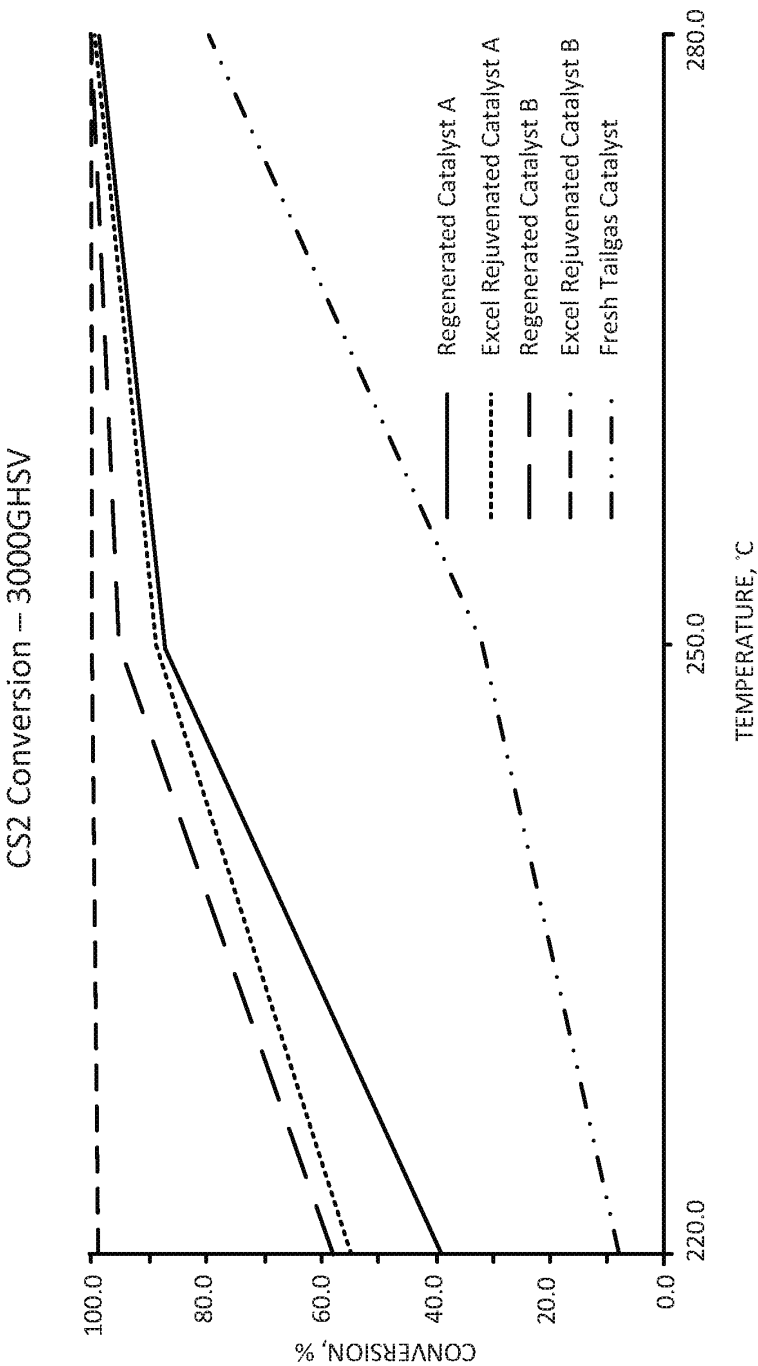


Figure 7

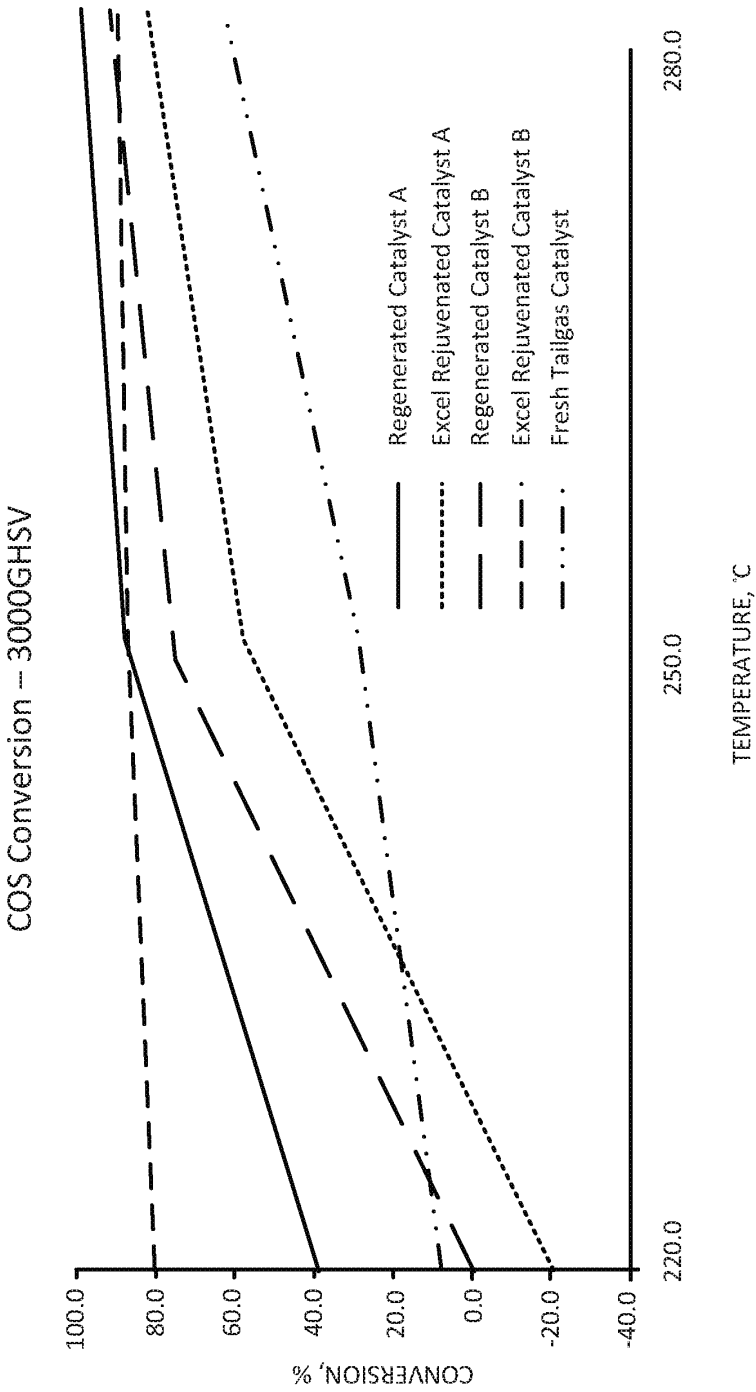


Figure 8

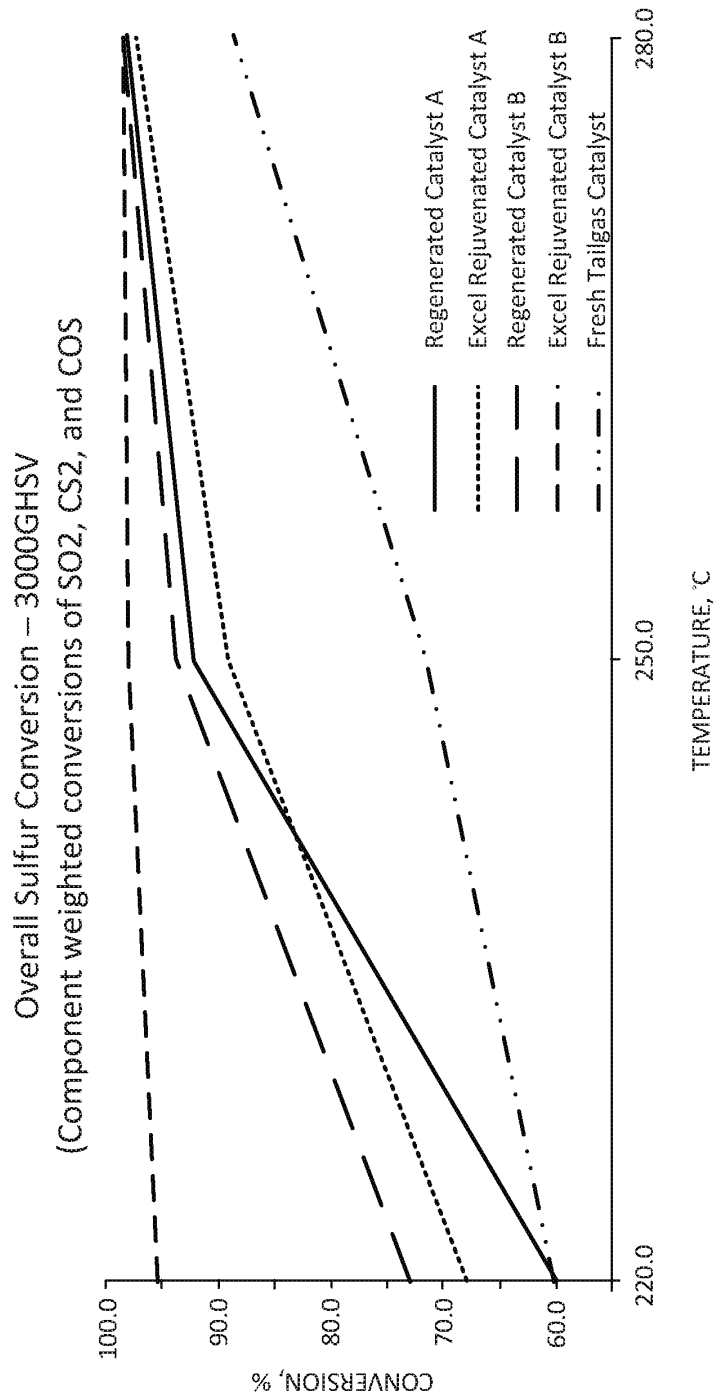
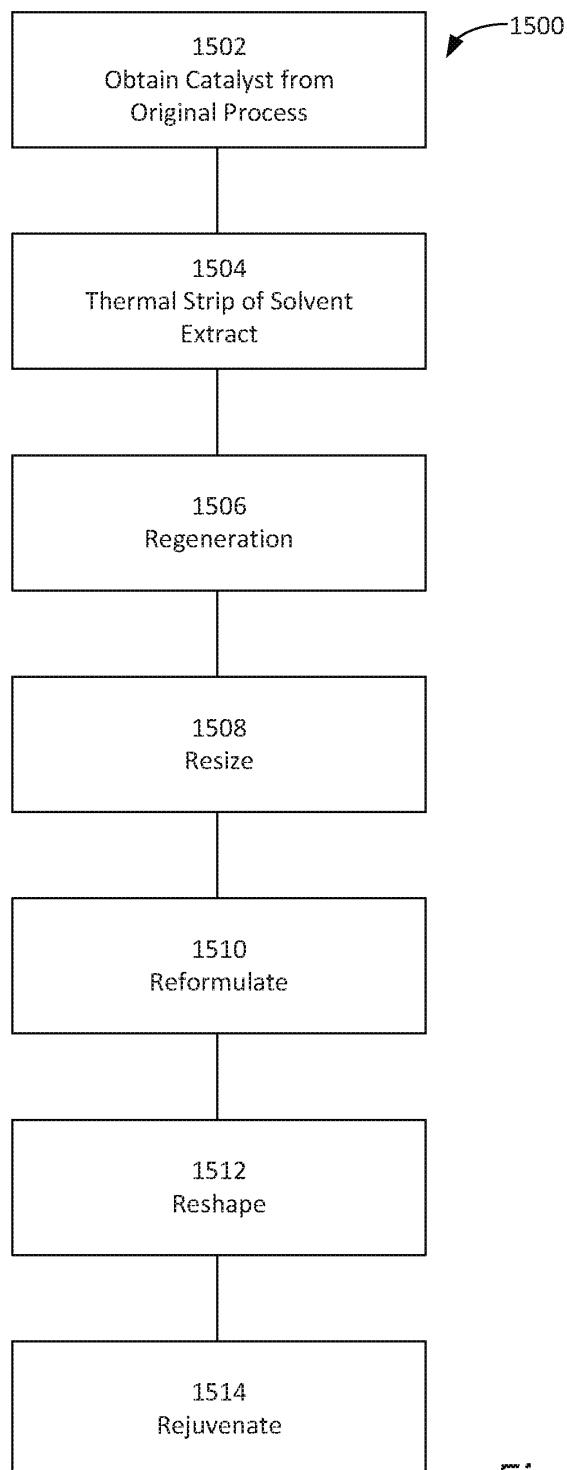


Figure 9

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*Figure 10*