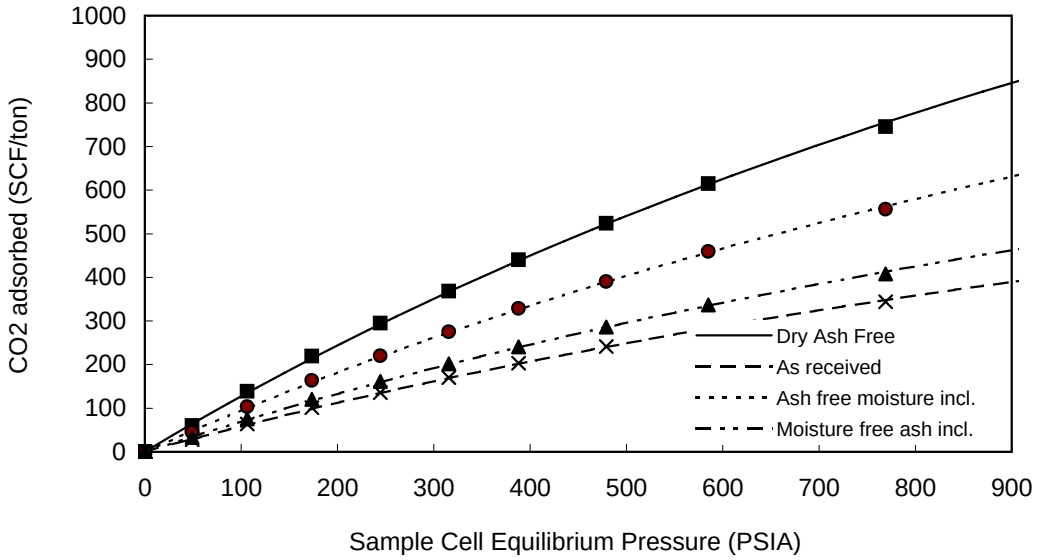
4-LA-1 Carbon Dioxide



Pressure (PSIA)	Adsorbed gas (ft^3 /ton)			
	As Received	moisture free ash incl.	ash free moisture incl.	Dry Ash Free
49	27.7	32.9	44.9	60.1
106	64.0	75.9	103.4	138.6
173	101.3	120.2	163.9	219.7
244	135.9	161.2	219.8	294.7
316	170.0	201.7	275.0	368.6
388	203.0	240.8	328.4	440.1
479	241.5	286.5	390.6	523.5
585	283.8	336.6	459.0	615.2
769	343.7	407.8	555.9	745.2

Langmuir Parameters

	As Received	Moisture free ash incl	Ash free moisture incl	Dry Ash Free
Vol. (ft^3 /ton)	1322.3	1568.5	2138.5	2866.4
Pressure (PSIA)	2150.0	2150.0	2150.0	2150.0

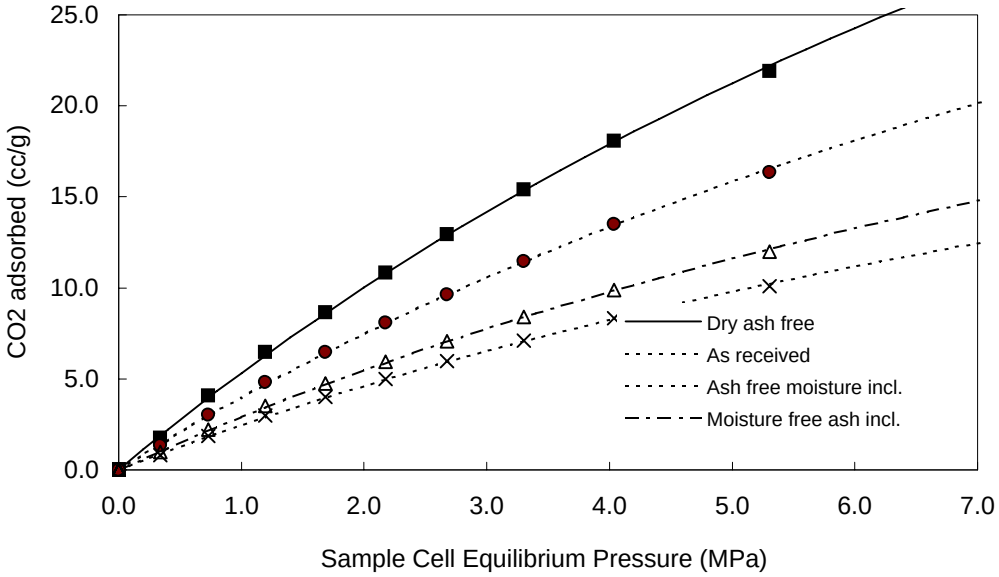
SUMMARY OF ADSORPTION ANALYSES IMP. UNITS

Isotherm Temperature: **97.0 ºF**

Goodness of fit of Langmuir regression: **0.94**

% Ash= **38.17** **% Moisture=** **15.70** **Density g/cc** **1.588**

4-LA-1 Carbon Dioxide



Pressure (MPa)	Adsorbed gas (cc/g)			
	As Received	Moisture free ash incl.	ash free moisture incl	Dry Ash Free
0.338	0.82	0.97	1.32	1.77
0.732	1.88	2.23	3.04	4.07
1.195	2.98	3.53	4.82	6.46
1.685	3.99	4.74	6.46	8.66
2.177	5.00	5.93	8.08	10.83
2.675	5.97	7.08	9.65	12.93
3.303	7.10	8.42	11.48	15.38
4.035	8.34	9.89	13.49	18.08
5.303	10.10	11.98	16.34	21.90

Langmuir Parameters

	As Received	Moisture free ash incl.	Ash free moisture incl	Dry Ash Free
Vol. (cc/g)	38.86	46.10	62.85	84.24
Pressure (MPa)	14.82	14.82	14.82	14.82

SUMMARY OF ADSORPTION ANALYSES SI UNITS

Isotherm Temperature: **36.1 ºC**

Goodness of fit of Langmuir regression: **0.94**

% Ash= **38.17** **% Moisture =** **15.70** **Density (g/cc)** **1.588**

4-LA-1 Carbon Dioxide

CO2 Adsorption (Imperial Units)

Summary of Analyses		
	As Received	DAF basis
Langmuir Volume (SCF)	1322	2866
Langmuir Pressure (PSIA)	2150	2150
Goodness of fit Langmuir Equation R-squared	0.94	0.94
Ash Content Wt.%	38.17	38.17
Equilibrium Moisture Wt.%	15.70	15.70

Contents of Appendix

data sheets	***Charts***
As Received	As Received
Dry Ash Free	Dry Ash Free
Dry Ash Included	Dry Ash Included
Moist Ash Free	Moist Ash Free

4-LA-1 Carbon Dioxide

GAS ADSORPTION ISOTHERM IMPERIAL UNITS

AS RECEIVED BASIS

		Moisture Content % :	15.70
Isotherm Temperature º F:	97.0	Ash Content, % :	38.17
Gas used:	CO2	Helium Density g/cc	1.588

PRESSURE (PSI)	ADSORBED GAS (SCF/ton)	P / V
49	27.75	1.77
106	63.96	1.66
173	101.34	1.71
244	135.93	1.80
316	170.04	1.86
388	203.03	1.91
479	241.49	1.98
585	283.78	2.06
769	343.74	2.24

Saturated Monolayer Volume (SCF/ton):	1322.3
Langmuir Pressure (PSIA):	2150.0
Correlation Coefficient:	0.9393

DRY ASH FREE BASIS

49	60.15	0.82
106	138.65	0.77
173	219.68	0.79
244	294.67	0.83
316	368.61	0.86
388	440.13	0.88
479	523.49	0.92
585	615.18	0.95
769	745.16	1.03

Saturated Monolayer Volume (SCF/ton, daf):	2866
Langmuir Pressure (PSIA):	2150
Correlation Coefficient:	0.9393

4-LA-1 Carbon Dioxide

GAS ADSORPTION ISOTHERM IMPERIAL UNITS

MOISTURE FREE ASH INCLUDED

		Moisture Content % :	15.70
Isotherm Temperature^{o} F:	97.0	Ash Content, % :	38.17
Gas used:	CO2	Helium Density g/cc	1.588

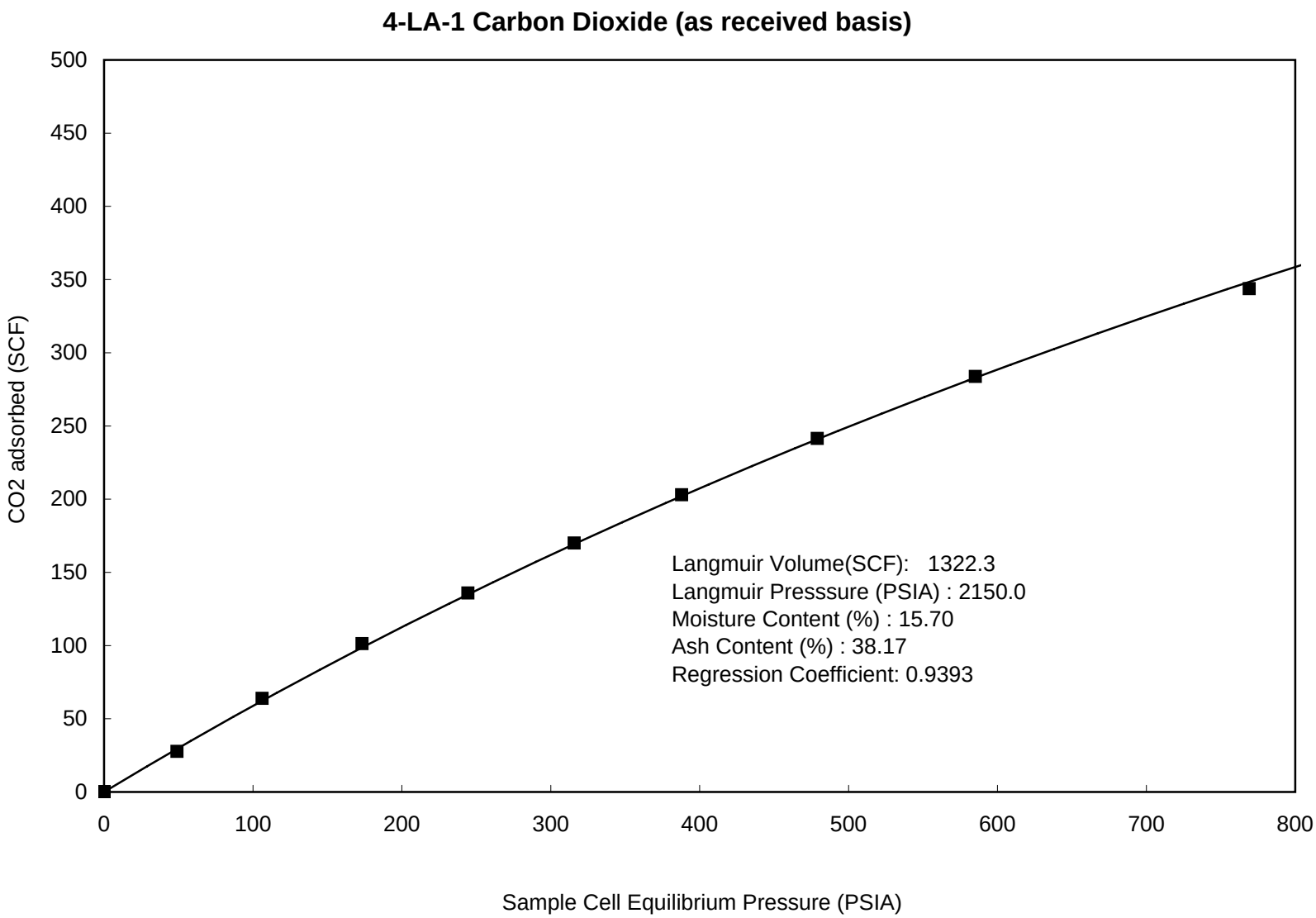
PRESSURE (PSI)	ADSORBED GAS (SCF/ton)	P / V
49	33	1.49
106	76	1.40
173	120	1.44
244	161	1.52
316	202	1.57
388	241	1.61
479	286	1.67
585	337	1.74
769	408	1.89

Saturated Monolayer Volume (SCF/ton):	1569
Langmuir Pressure (PSIA):	2150
Correlation Coefficient:	0.9393

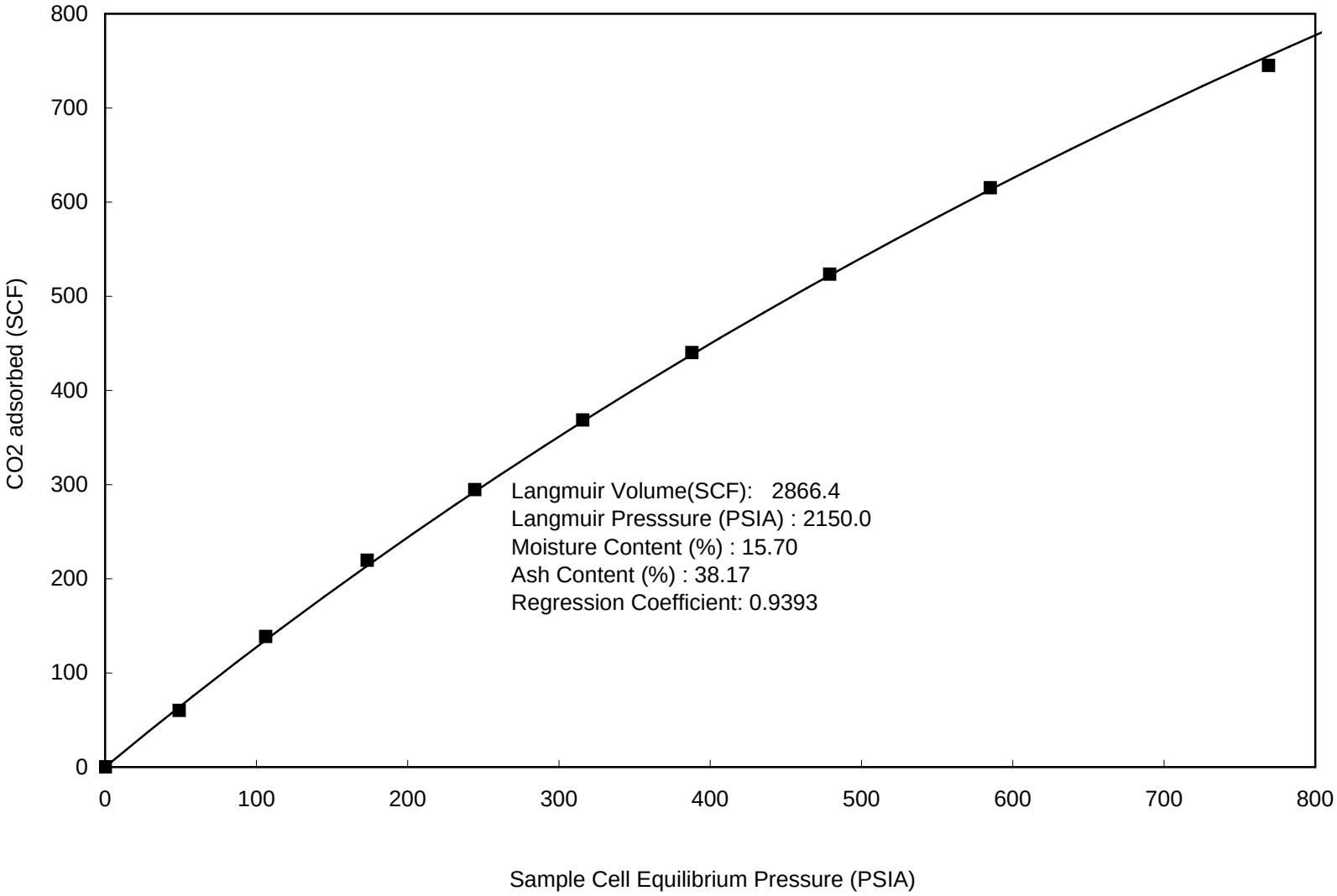
ASH FREE MOISTURE INCLUDED

49	45	1.09
106	103	1.03
173	164	1.06
244	220	1.11
316	275	1.15
388	328	1.18
479	391	1.23
585	459	1.28
769	556	1.38

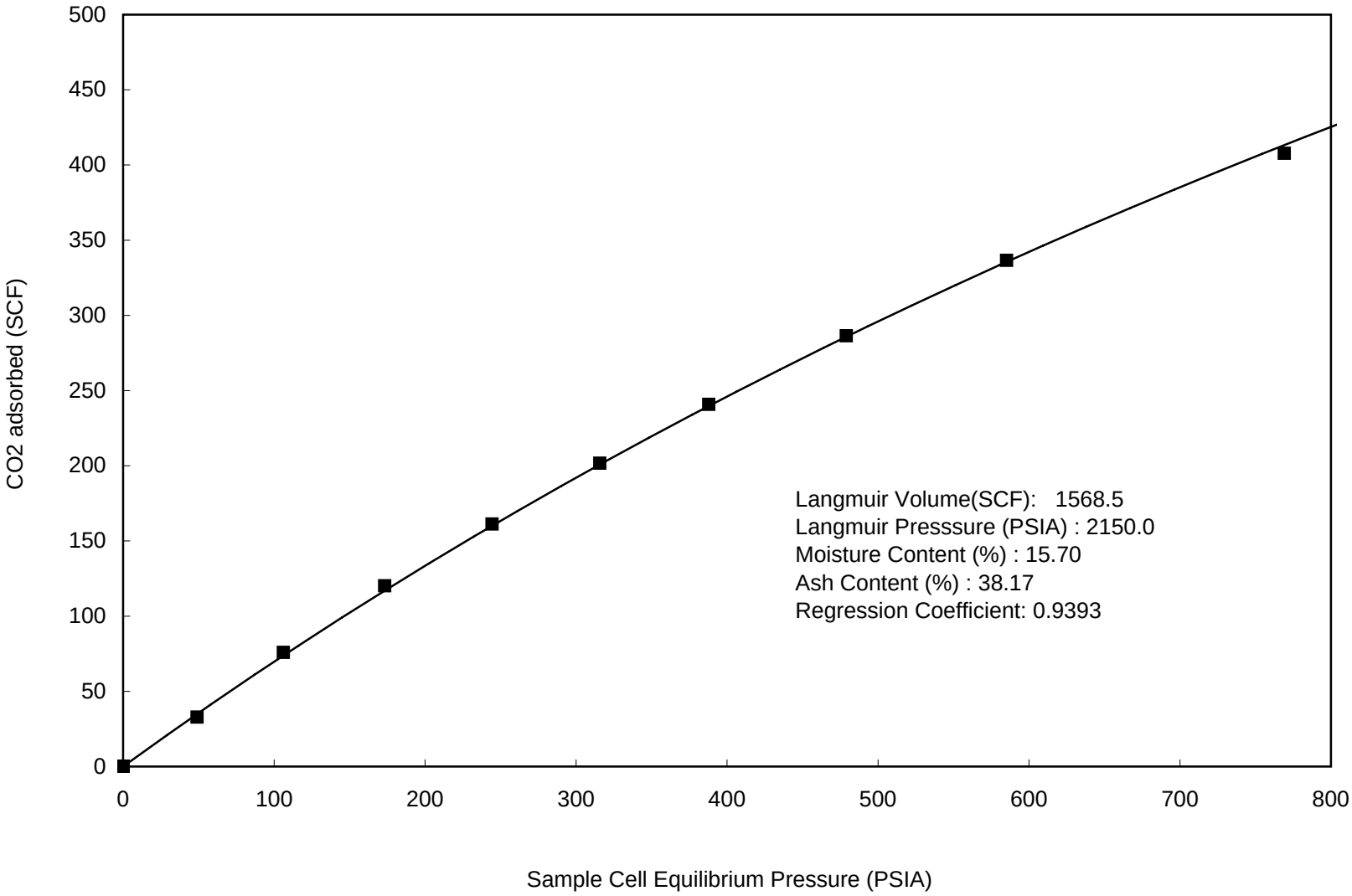
Saturated Monolayer Volume (SCF/ton):	2139
Langmuir Pressure (PSIA):	2150
Correlation Coefficient:	0.9393


4-LA-1 Carbon Dioxide (as received basis)
CO2 adsorbed (SCF)
Sample Cell Equilibrium Pressure (PSIA)
0
50
100
150
200
250
300
350
400
450
500
0
100
200
300
400
500
600
700
800
Langmuir Volume(SCF): 1322.3
Langmuir Presssure (PSIA) : 2150.0
Moisture Content (%) : 15.70
Ash Content (%) : 38.17
Regression Coefficient: 0.9393

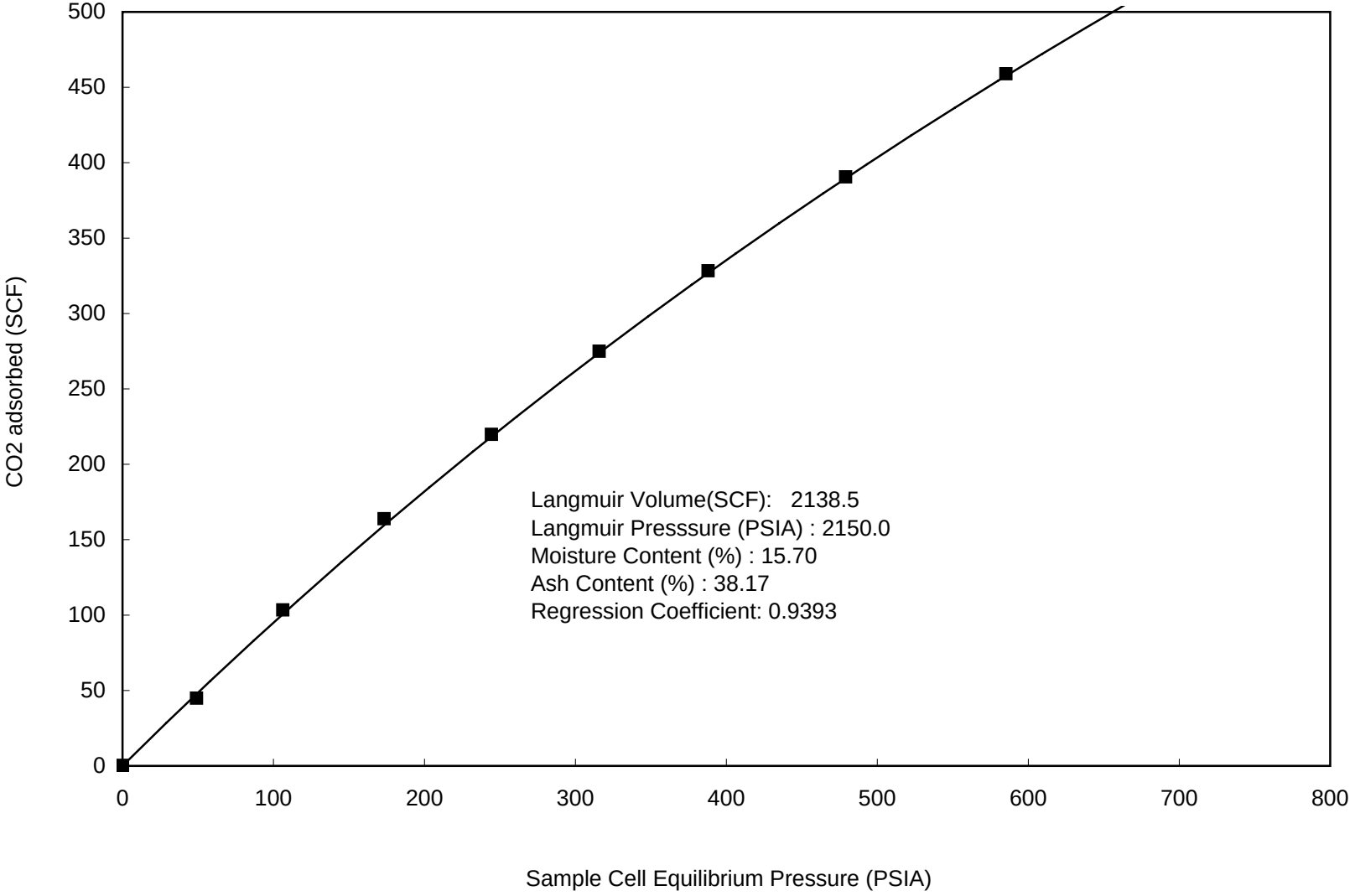
4-LA-1 Carbon Dioxide (dry & ash free basis)



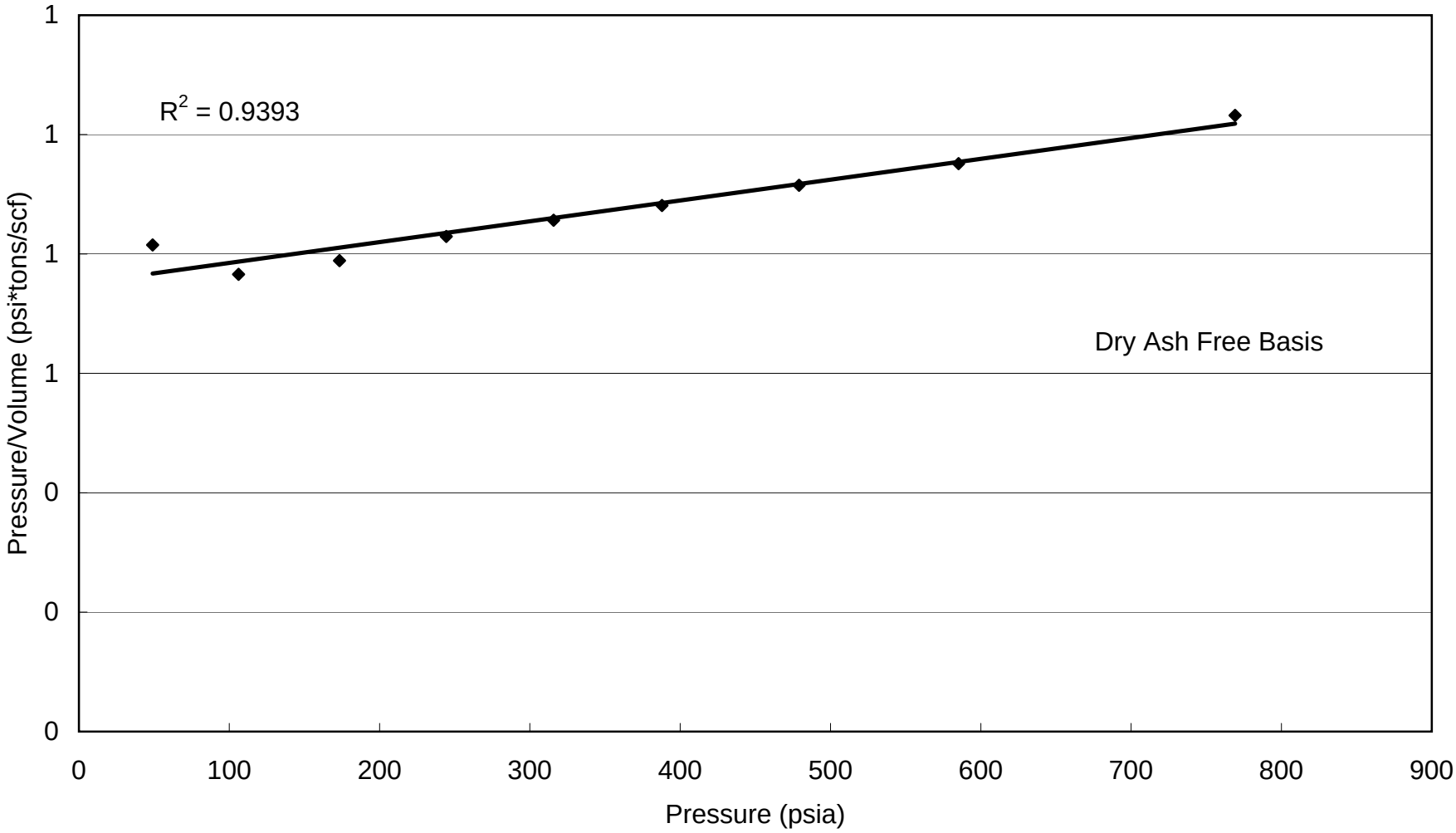
4-LA-1 Carbon Dioxide (moisture free, ash included basis)



4-LA-1 Carbon Dioxide (ash free, moisture included basis)



Adsorption Langmuir Plot



4-LA-1 Carbon Dioxide

CO2 Adsorption (SI Units)

Summary of Analyses

	As Received	DAF basis
Langmuir Volume cc/g	38.86	84.24
Langmuir Pressure MPa	14.82	14.82
Goodness of fit Langmuir Equation R-squared	0.94	0.94
Ash Content Wt.%	38.17	38.17
Equilibrium Moisture Wt.%	15.70	15.70

Contents of Appendix

4-LA-1 Carbon Dioxide

GAS ADSORPTION ISOTHERM SI UNITS

AS RECEIVED BASIS

Sample I.D. :	4-LA-1 Carbon Dioxide	Moisture Content (EQ) % :	15.70
Isotherm Temperature º C:	36.1	Ash Content % :	38.17
Gas used:	CO2	Helium Density g/cc	1.588

PRESSURE (MPa)	ADSORBED GAS (cc/g @STP)	P / V
0.338	0.82	0.415
0.732	1.88	0.389
1.195	2.98	0.401
1.685	3.99	0.422
2.177	5.00	0.436
2.675	5.97	0.448
3.303	7.10	0.465
4.035	8.34	0.484
5.303	10.10	0.525

Saturated Monolayer Volume (cc/g @ STP):	38.86
Langmuir Pressure (MPa):	14.82

DRY ASH FREE BASIS

0.338	1.77	0.191
0.732	4.07	0.180
1.195	6.46	0.185
1.685	8.66	0.195
2.177	10.83	0.201
2.675	12.93	0.207
3.303	15.38	0.215
4.035	18.08	0.223
5.303	21.90	0.242

Saturated Monolayer Volume (cc/g @ STP, daf):	84.24
Langmuir Pressure (MPa):	14.82
Correlation Coefficient:	0.9393

4-LA-1 Carbon Dioxide

GAS ADSORPTION ISOTHERM SI UNITS

MOISTURE FREE ASH INCLUDED

		Moisture Content (EQ) % :	15.70
Isotherm Temperature º C:	36.1	Ash Content % :	38.17
Gas used:	CO2	Helium Density g/cc	1.588

PRESSURE (MPa)	ADSORBED GAS (cc/g@STP)	P / V
0.338	0.97	0.35
0.732	2.23	0.33
1.195	3.53	0.34
1.685	4.74	0.36
2.177	5.93	0.37
2.675	7.08	0.38
3.303	8.42	0.39
4.035	9.89	0.41
5.303	11.98	0.44

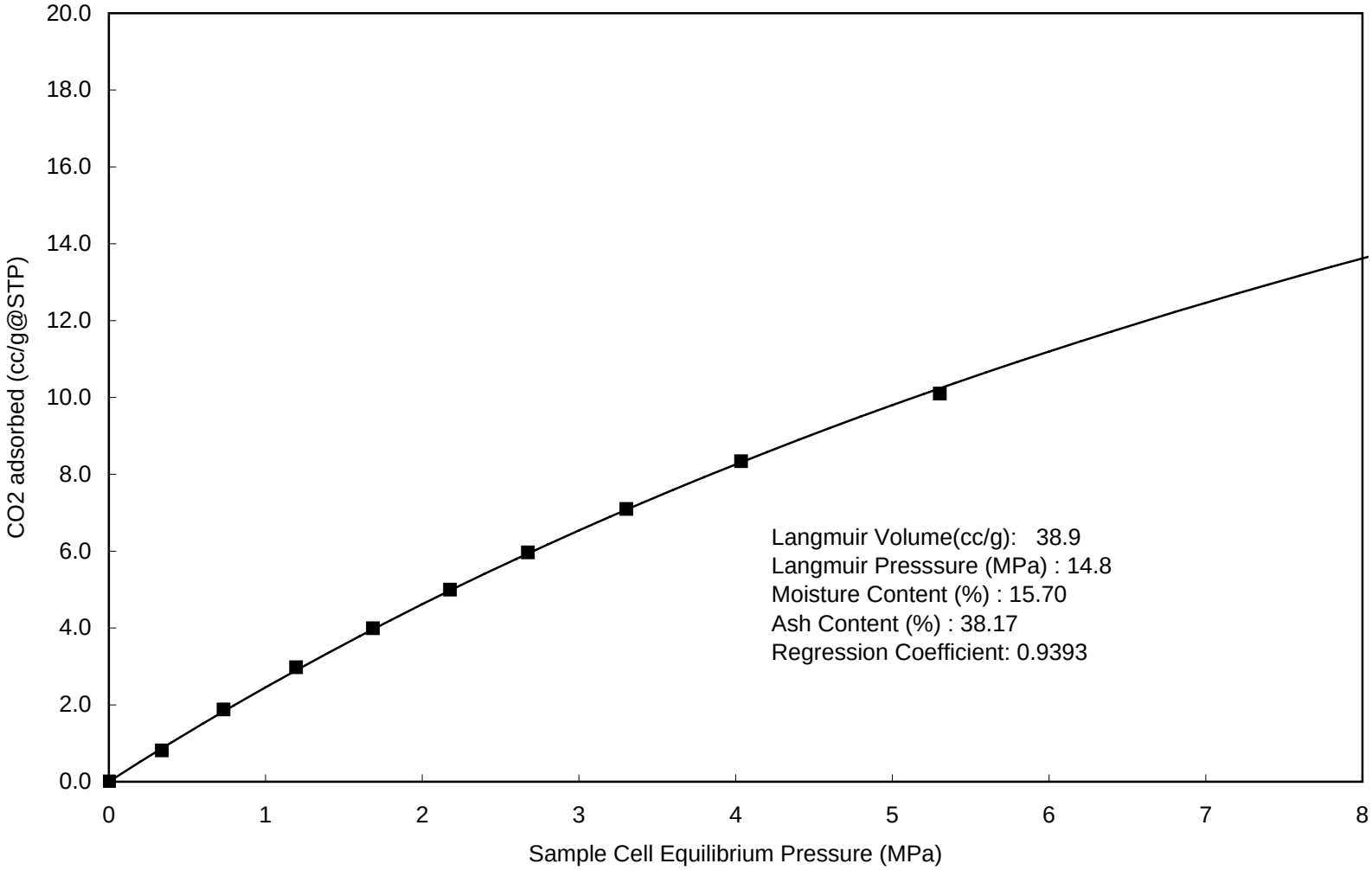
Saturated Monolayer Volume (cc/g):	46.10
Langmuir Pressure (MPa):	14.82

ASH FREE MOISTURE INCLUDED

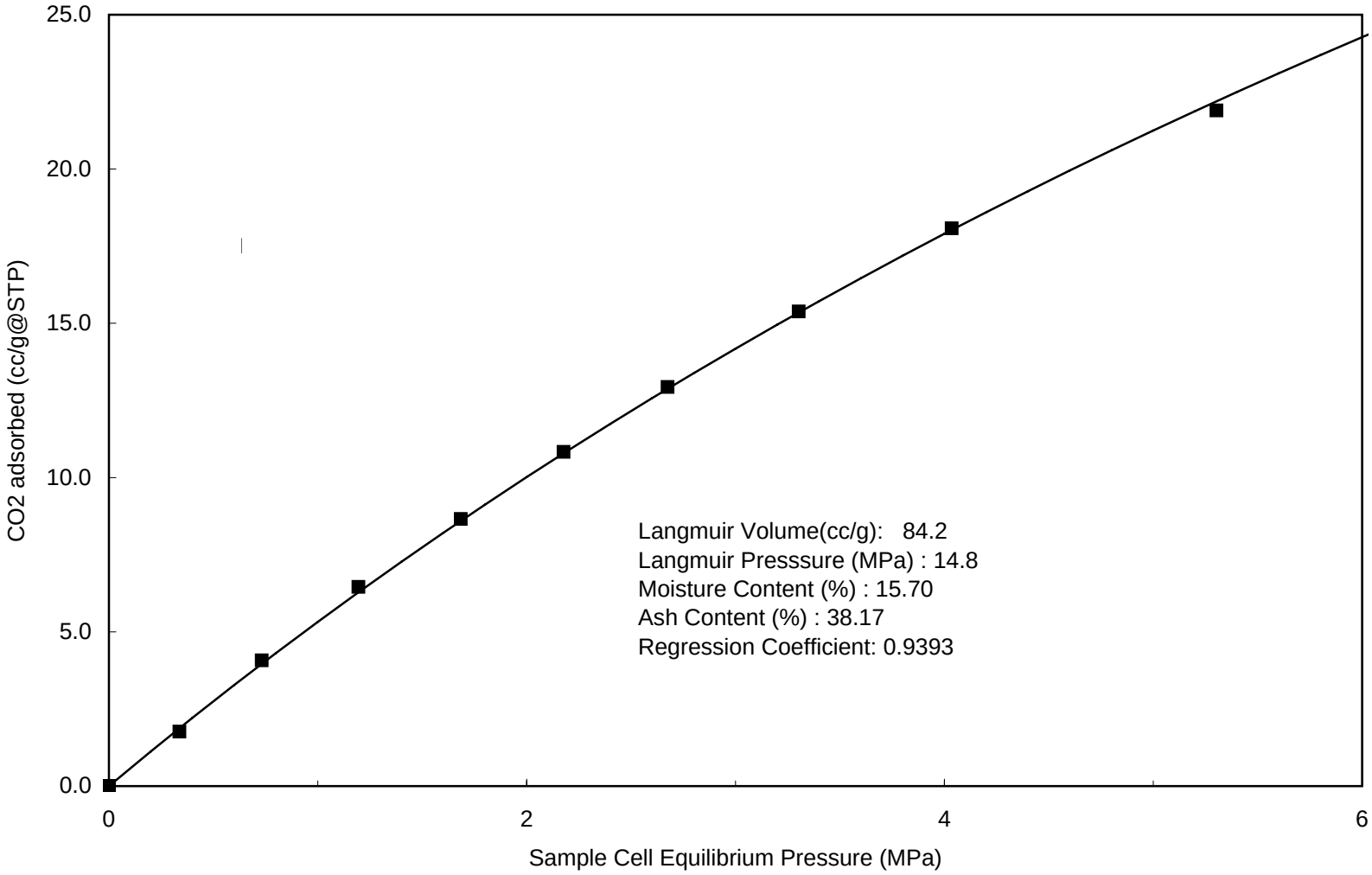
0.338	1.32	0.00
0.732	3.04	0.24
1.195	4.82	0.25
1.685	6.46	0.26
2.177	8.08	0.27
2.675	9.65	0.28
3.303	11.48	0.29
4.035	13.49	0.30
5.303	16.34	0.32

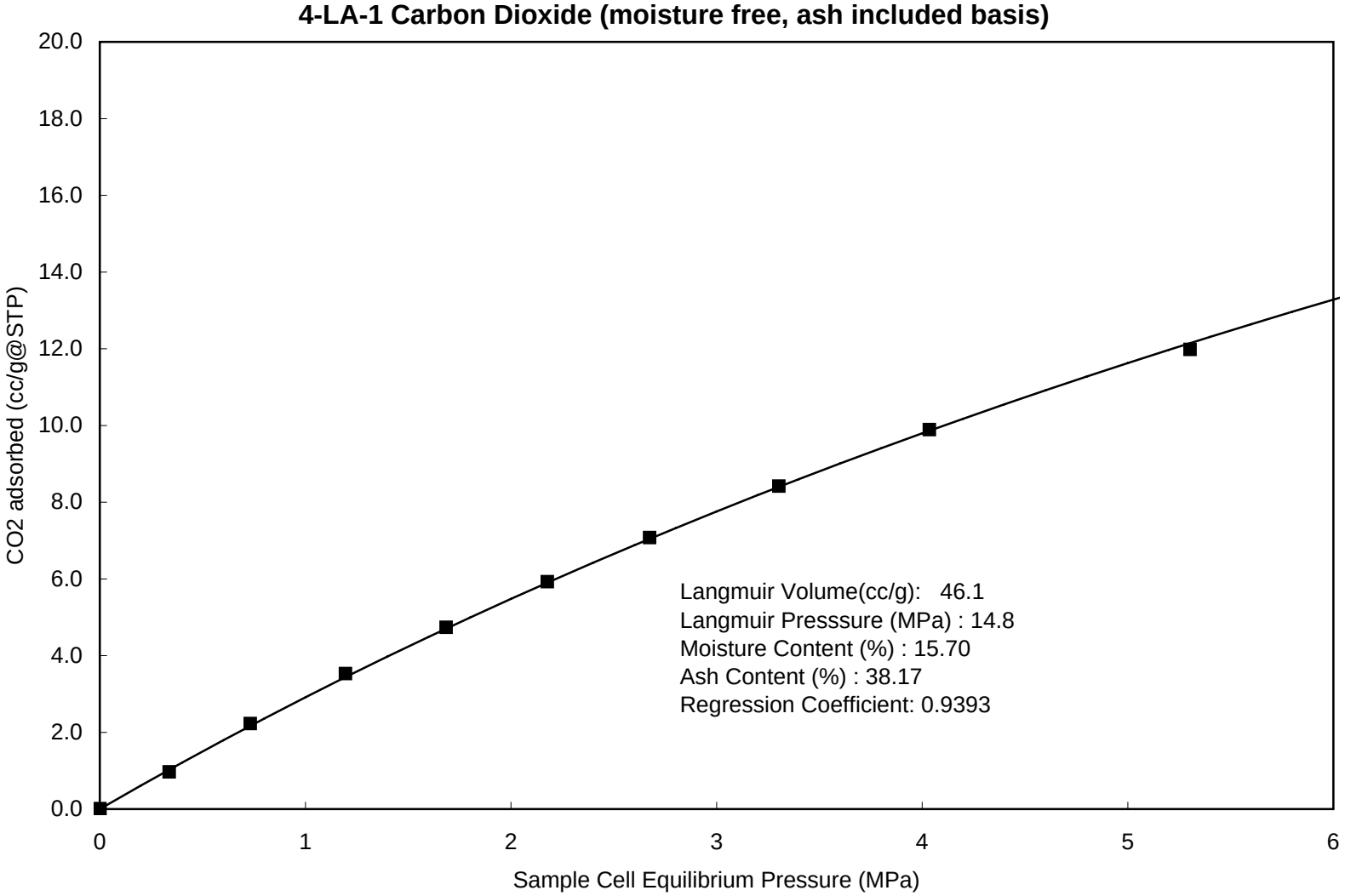
Saturated Monolayer Volume (cc/g, ash free):	62.85
Langmuir Pressure (MPa):	14.82
Correlation Coefficient:	0.9393

4-LA-1 Carbon Dioxide (as received basis)

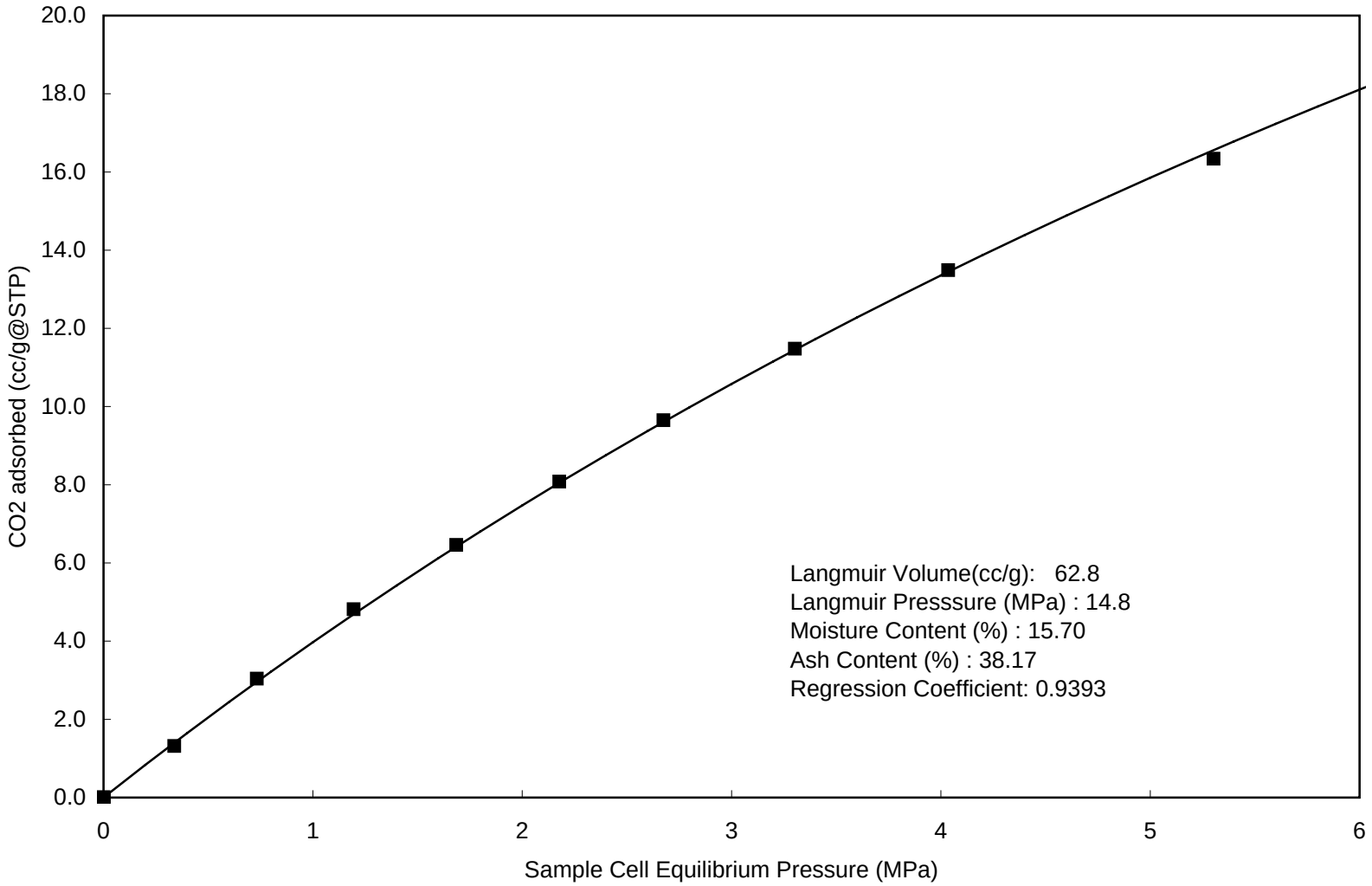


4-LA-1 Carbon Dioxide (dry & ash free basis)




4-LA-1 Carbon Dioxide (moisture free, ash included basis)
CO2 adsorbed (cc/g@STP)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
1
2
3
4
5
6
Sample Cell Equilibrium Pressure (MPa)
Langmuir Volume(cc/g): 46.1
Langmuir Presssure (MPa) : 14.8
Moisture Content (%) : 15.70
Ash Content (%) : 38.17
Regression Coefficient: 0.9393

4-LA-1 Carbon Dioxide (ash free, moisture included basis)



Adsorption Langmuir Plot