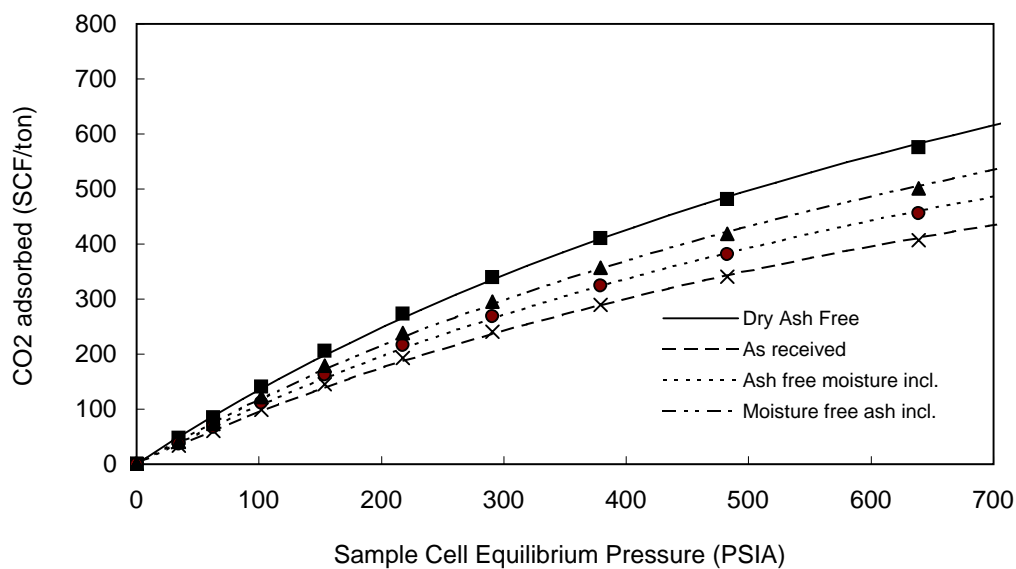


## 4-LA-2 Carbon Dioxide



Pressure (PSIA)	Adsorbed gas (ft <sup>3</sup> /ton)			
	As Received	moisture free ash incl.	ash free moisture incl.	Dry Ash Free
35	33.4	41.1	37.4	47.3
63	59.9	73.7	67.0	84.8
102	99.3	122.1	111.1	140.4
154	145.2	178.7	162.4	205.4
217	193.5	238.0	216.4	273.7
291	240.4	295.7	268.9	340.0
379	290.1	356.8	324.4	410.2
482	340.7	419.1	381.0	481.8
639	407.1	500.8	455.3	575.7

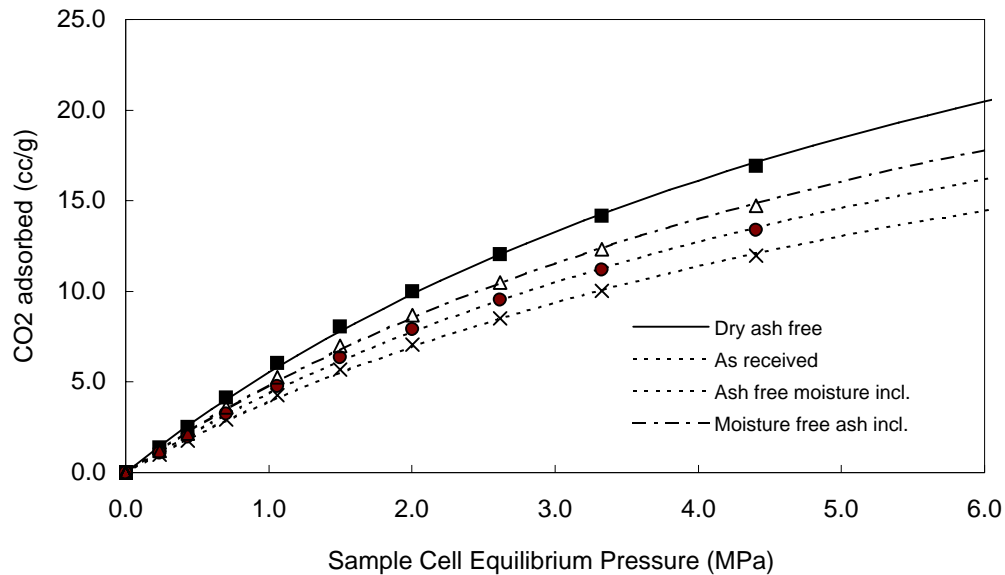
### Langmuir Parameters

	As Received	Moisture free ash incl	Ash free moisture incl	Dry Ash Free
Vol. (ft <sup>3</sup> /ton)	1071.9	1318.4	1198.8	1515.9
Pressure (PSIA)	1023.4	1023.4	1023.4	1023.4

### SUMMARY OF ADSORPTION ANALYSES IMP. UNITS

Isotherm Temperature: 118.4 °F  
 Goodness of fit of Langmuir regression: 0.97  
 % Ash= 10.59      % Moisture= 18.70      Density g/cc 1.362

### 4-LA-2 Carbon Dioxide



Pressure (MPa)	Adsorbed gas (cc/g)			
	As Received	Moisture free ash incl.	ash free moisture incl	Dry Ash Free
0.239	0.98	1.21	1.10	1.39
0.433	1.76	2.17	1.97	2.49
0.703	2.92	3.59	3.26	4.13
1.061	4.27	5.25	4.77	6.04
1.499	5.69	6.99	6.36	8.04
2.003	7.07	8.69	7.90	9.99
2.613	8.52	10.49	9.53	12.06
3.327	10.01	12.32	11.20	14.16
4.406	11.96	14.72	13.38	16.92

#### Langmuir Parameters

	As Received	Moisture free ash incl.	Ash free moisture incl	Dry Ash Free
Vol. (cc/g)	31.50	38.75	35.23	44.55
Pressure (MPa)	7.06	7.06	7.06	7.06

### SUMMARY OF ADSORPTION ANALYSES SI UNITS

Isotherm Temperature:

48.0 °C

Goodness of fit of Langmuir regression:

0.97

% Ash= 10.59

% Moisture =

18.70

Density (g/cc)

1.362

## 4-LA-2 Carbon Dioxide

### CO2 Adsorption (Imperial Units)

#### ***Summary of Analyses***

	As Received	DAF basis
Langmuir Volume (SCF)	1072	1516
Langmuir Pressure (PSIA)	1023	1023
Goodness of fit Langmuir		
Equation R-squared	0.97	0.97
Ash Content Wt.%	10.59	10.59
Equilibrium Moisture Wt.%	18.70	18.70

#### **Contents of Appendix**

##### ***data sheets***

As Received  
Dry Ash Free  
Dry Ash Included  
Moist Ash Free

##### ***Charts***

As Received  
Dry Ash Free  
Dry Ash Included  
Moist Ash Free

**4-LA-2 Carbon Dioxide**  
**GAS ADSORPTION ISOTHERM IMPERIAL UNITS**

**AS RECEIVED BASIS**

Isotherm Temperature ° F:	118.4	Moisture Content % :	18.70
Gas used:	CO2	Ash Content, % :	10.59
		Helium Density g/cc	1.362

PRESSURE (PSI)	ADSORBED GAS (SCF/ton)	P / V
35	33.42	1.04
63	59.95	1.05
102	99.30	1.03
154	145.24	1.06
217	193.50	1.12
291	240.41	1.21
379	290.06	1.31
482	340.70	1.42
639	407.11	1.57

Saturated Monolayer Volume (SCF/ton):	1071.9
Langmuir Pressure (PSIA):	1023.4
Correlation Coefficient:	0.9745

**DRY ASH FREE BASIS**

35	47.27	0.73
63	84.78	0.74
102	140.43	0.73
154	205.41	0.75
217	273.65	0.79
291	339.99	0.85
379	410.21	0.92
482	481.82	1.00
639	575.75	1.11

Saturated Monolayer Volume (SCF/ton, daf):	1516
Langmuir Pressure (PSIA):	1023
Correlation Coefficient:	0.9745

# **4-LA-2 Carbon Dioxide** **GAS ADSORPTION ISOTHERM IMPERIAL UNITS**

## **MOISTURE FREE ASH INCLUDED**

Moisture Content % :	18.70
Ash Content, % :	10.59
Helium Density g/cc	1.362
Isotherm Temperature° F:	118.4
Gas used:	CO2

PRESSURE (PSI)	ADSORBED GAS (SCF/ton)	P / V
35	41	0.84
63	74	0.85
102	122	0.84
154	179	0.86
217	238	0.91
291	296	0.98
379	357	1.06
482	419	1.15
639	501	1.28

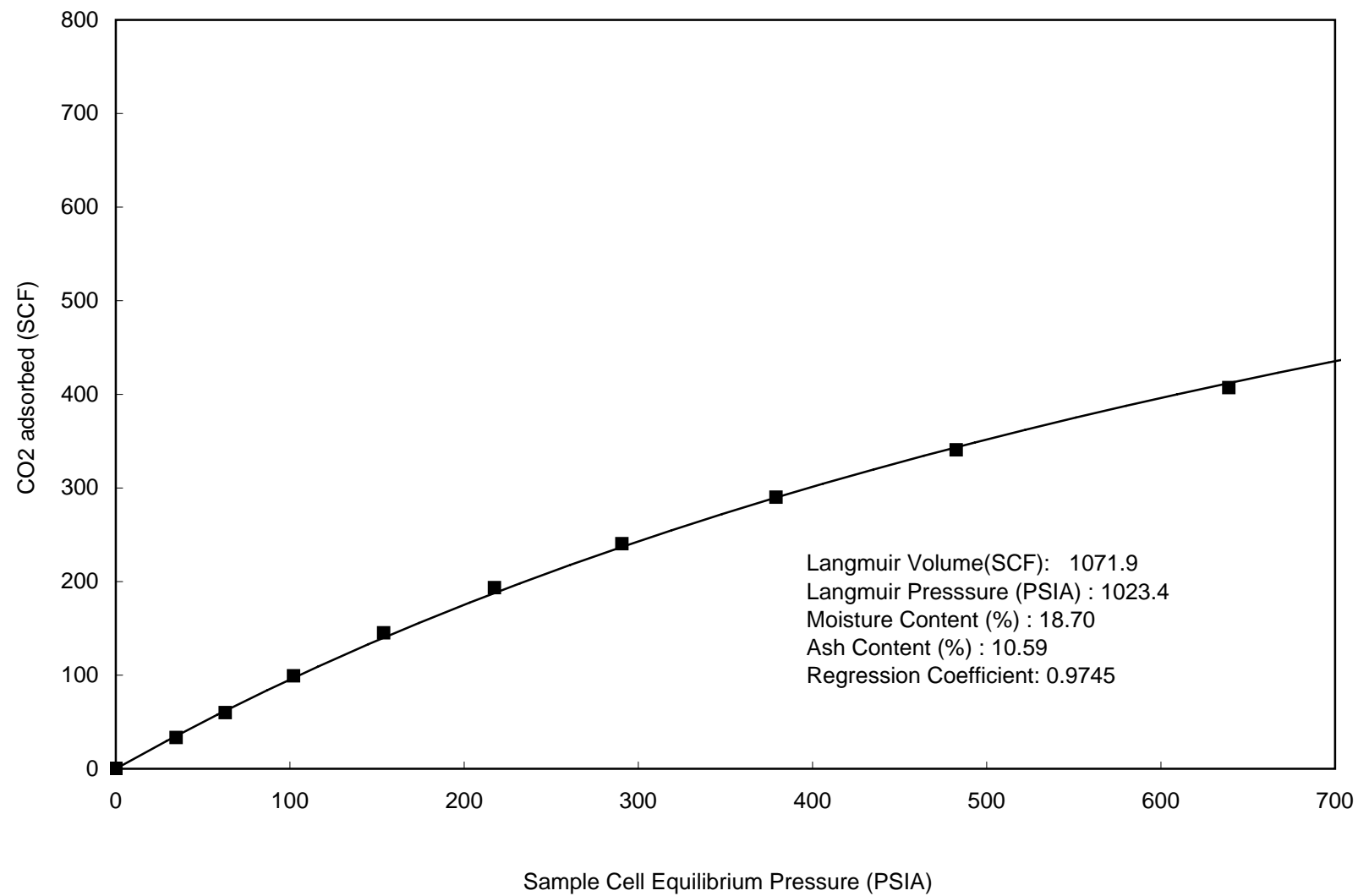
Saturated Monolayer Volume (SCF/ton):	1318
Langmuir Pressure (PSIA):	1023
Correlation Coefficient:	0.9745

## **ASH FREE MOISTURE INCLUDED**

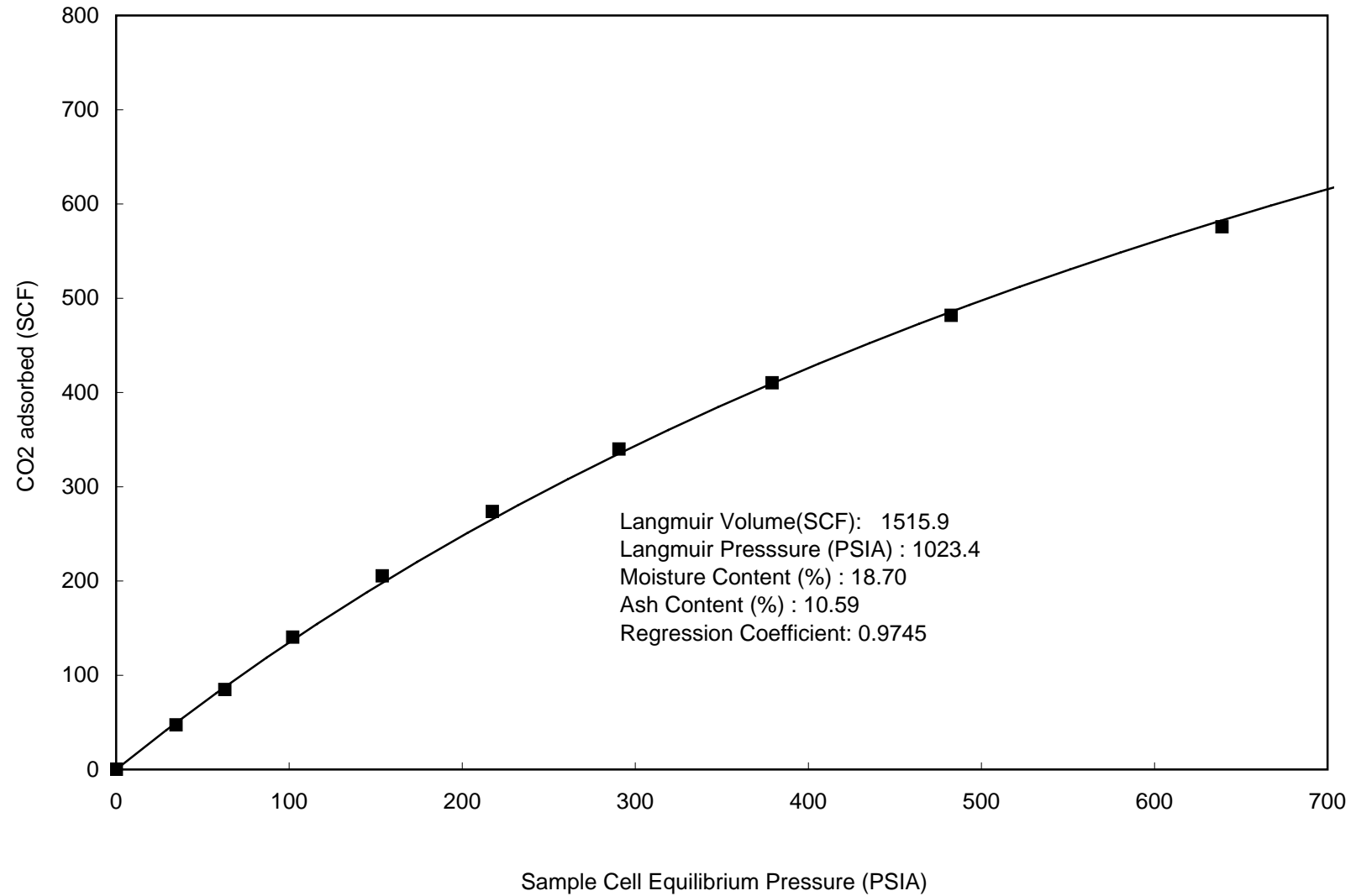
35	37	0.93
63	67	0.94
102	111	0.92
154	162	0.95
217	216	1.00
291	269	1.08
379	324	1.17
482	381	1.27
639	455	1.40

Saturated Monolayer Volume (SCF/ton):	1199
Langmuir Pressure (PSIA):	1023
Correlation Coefficient:	0.9745

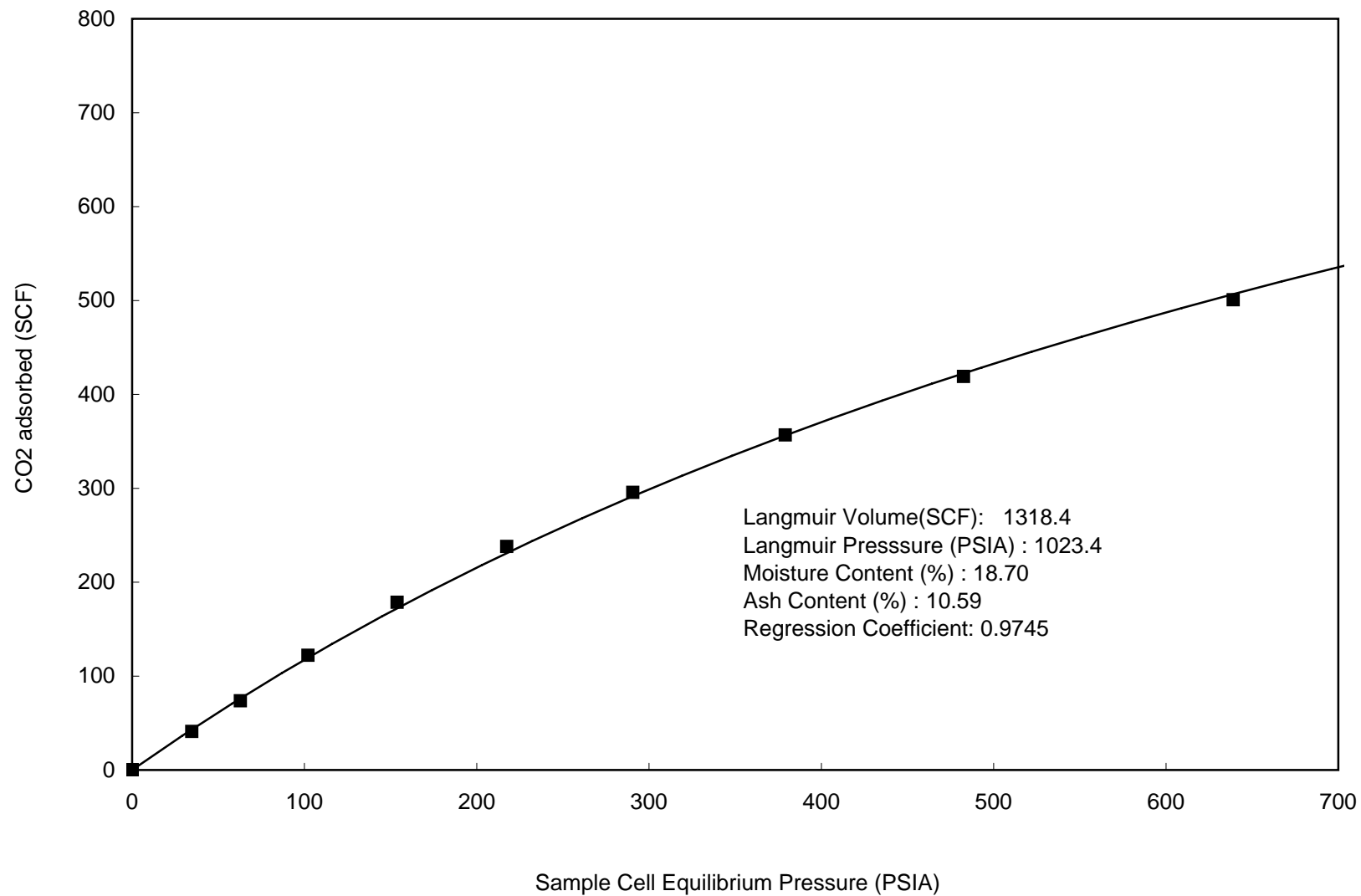
### 4-LA-2 Carbon Dioxide (as received basis)



### 4-LA-2 Carbon Dioxide (dry & ash free basis)

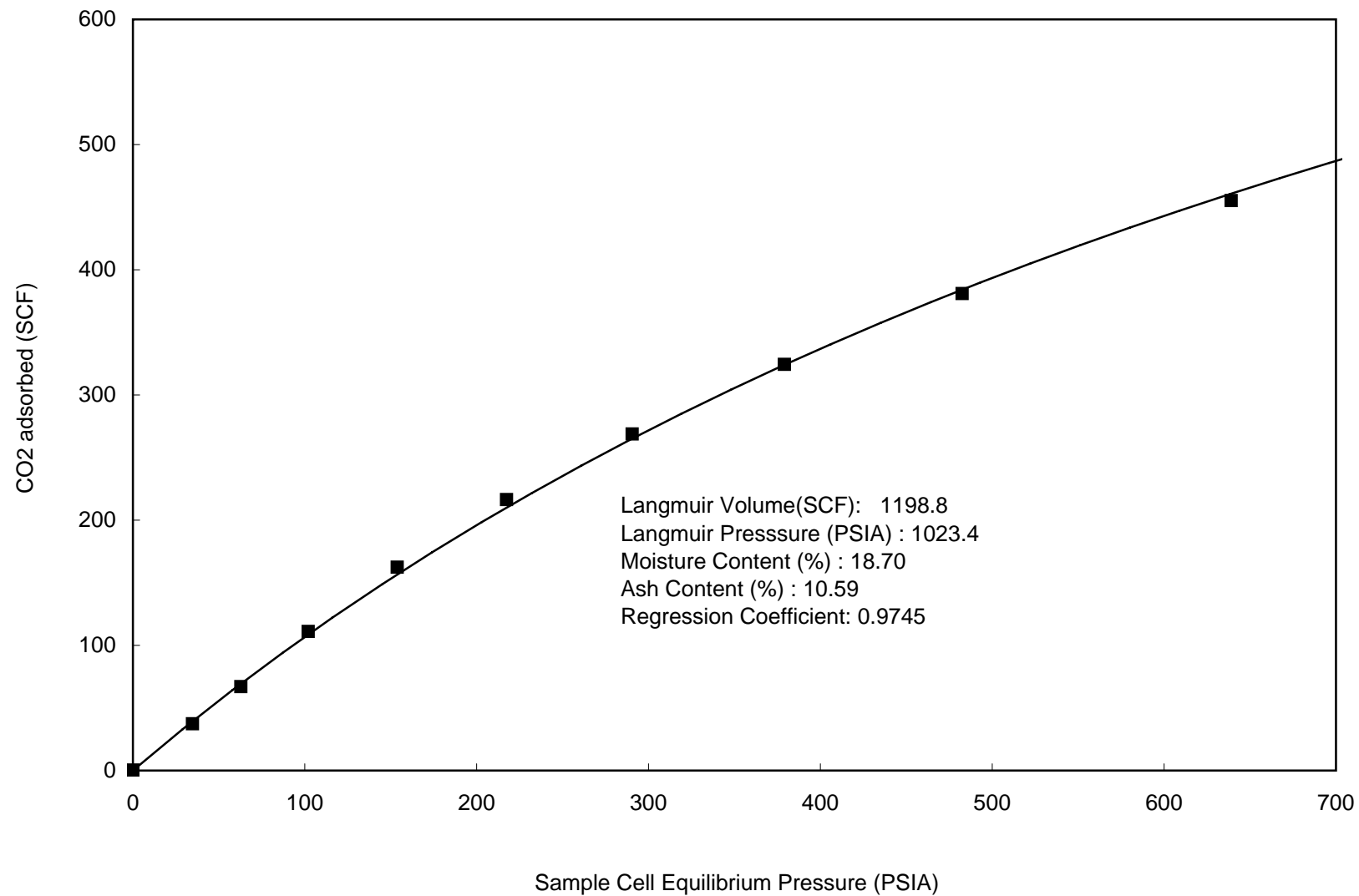


### 4-LA-2 Carbon Dioxide (moisture free, ash included basis)

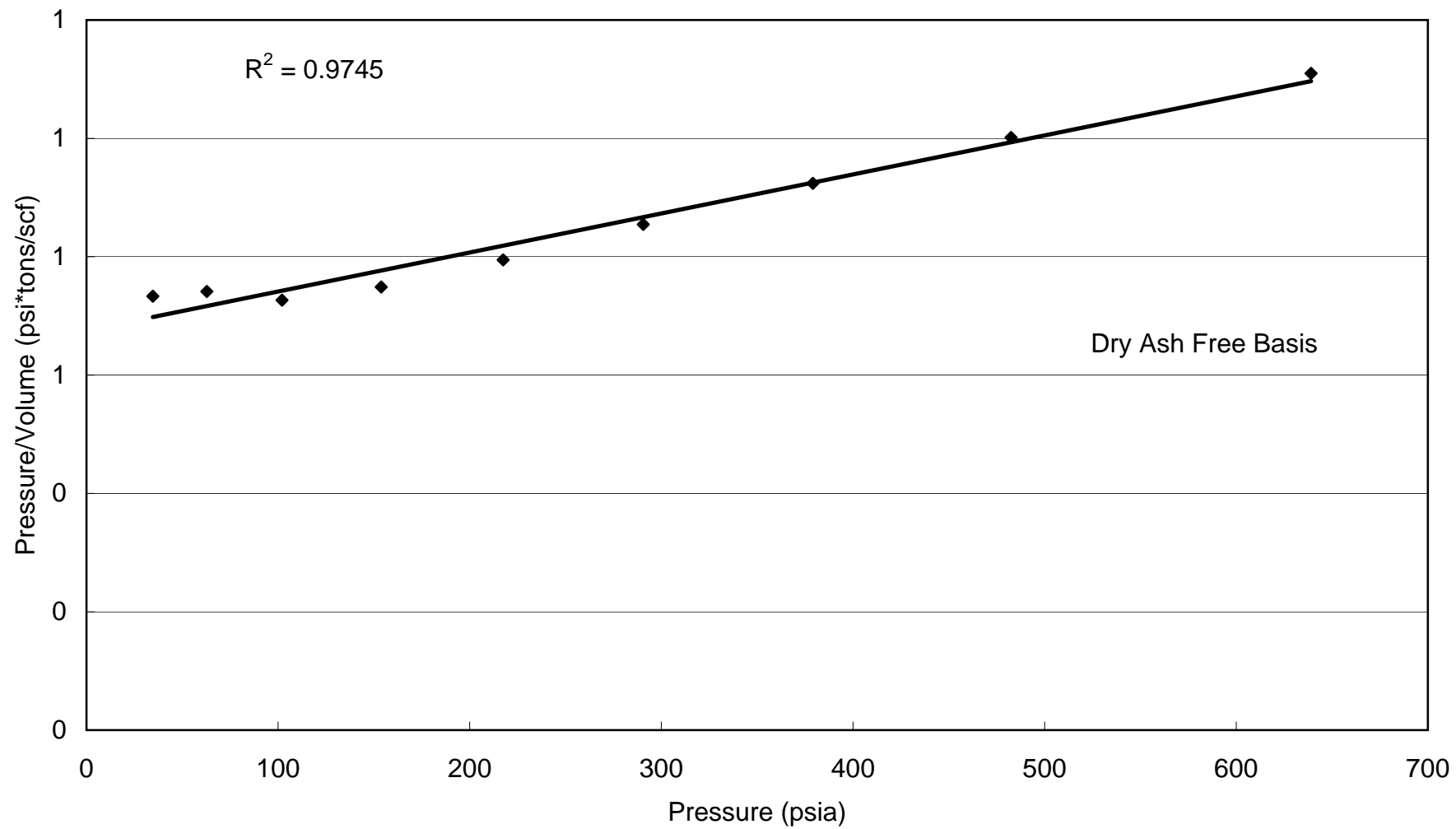




### 4-LA-2 Carbon Dioxide (ash free, moisture included basis)



## Adsorption Langmuir Plot



## 4-LA-2 Carbon Dioxide

### CO2 Adsorption (SI Units)

#### **Summary of Analyses**

	As Received	DAF basis
Langmuir Volume cc/g	31.50	44.55
Langmuir Pressure MPa	7.06	7.06
Goodness of fit Langmuir		
Equation R-squared	0.97	0.97
Ash Content Wt.%	10.59	10.59
Equilibrium Moisture Wt.%	18.70	18.70

#### **Contents of Appendix**

##### ***data sheets***

As Received  
Dry Ash Free  
Dry Ash Included  
Moist Ash Free

##### ***Charts***

As Received  
Dry Ash Free  
Dry Ash Included  
Moist Ash Free

**4-LA-2 Carbon Dioxide**  
**GAS ADSORPTION ISOTHERM SI UNITS**

**AS RECEIVED BASIS**

Sample I.D. :	4-LA-2 Carbon Dioxide	Moisture Content (EQ) % :	18.70
Isotherm Temperature ° C:	48	Ash Content % :	10.59
Gas used:	CO2	Helium Density g/cc	1.362

PRESSURE (MPa)	ADSORBED GAS (cc/g @STP)	P / V
0.239	0.98	0.243
0.433	1.76	0.246
0.703	2.92	0.241
1.061	4.27	0.248
1.499	5.69	0.264
2.003	7.07	0.284
2.613	8.52	0.307
3.327	10.01	0.332
4.406	11.96	0.368

Saturated Monolayer Volume (cc/g @ STP):	31.50
Langmuir Pressure (MPa):	7.06

**DRY ASH FREE BASIS**

0.239	1.39	0.172
0.433	2.49	0.174
0.703	4.13	0.170
1.061	6.04	0.176
1.499	8.04	0.186
2.003	9.99	0.200
2.613	12.06	0.217
3.327	14.16	0.235
4.406	16.92	0.260

Saturated Monolayer Volume (cc/g @ STP, daf):	44.55
Langmuir Pressure (MPa):	7.06
Correlation Coefficient:	0.9745

## 4-LA-2 Carbon Dioxide

### GAS ADSORPTION ISOTHERM SI UNITS

#### MOISTURE FREE ASH INCLUDED

Isotherm Temperature ° C:	48	Moisture Content (EQ) % :	18.70
Gas used:	CO2	Ash Content % :	10.59
		Helium Density g/cc	1.362

PRESSURE (MPa)	ADSORBED GAS (cc/g@STP)	P / V
0.239	1.21	0.20
0.433	2.17	0.20
0.703	3.59	0.20
1.061	5.25	0.20
1.499	6.99	0.21
2.003	8.69	0.23
2.613	10.49	0.25
3.327	12.32	0.27
4.406	14.72	0.30

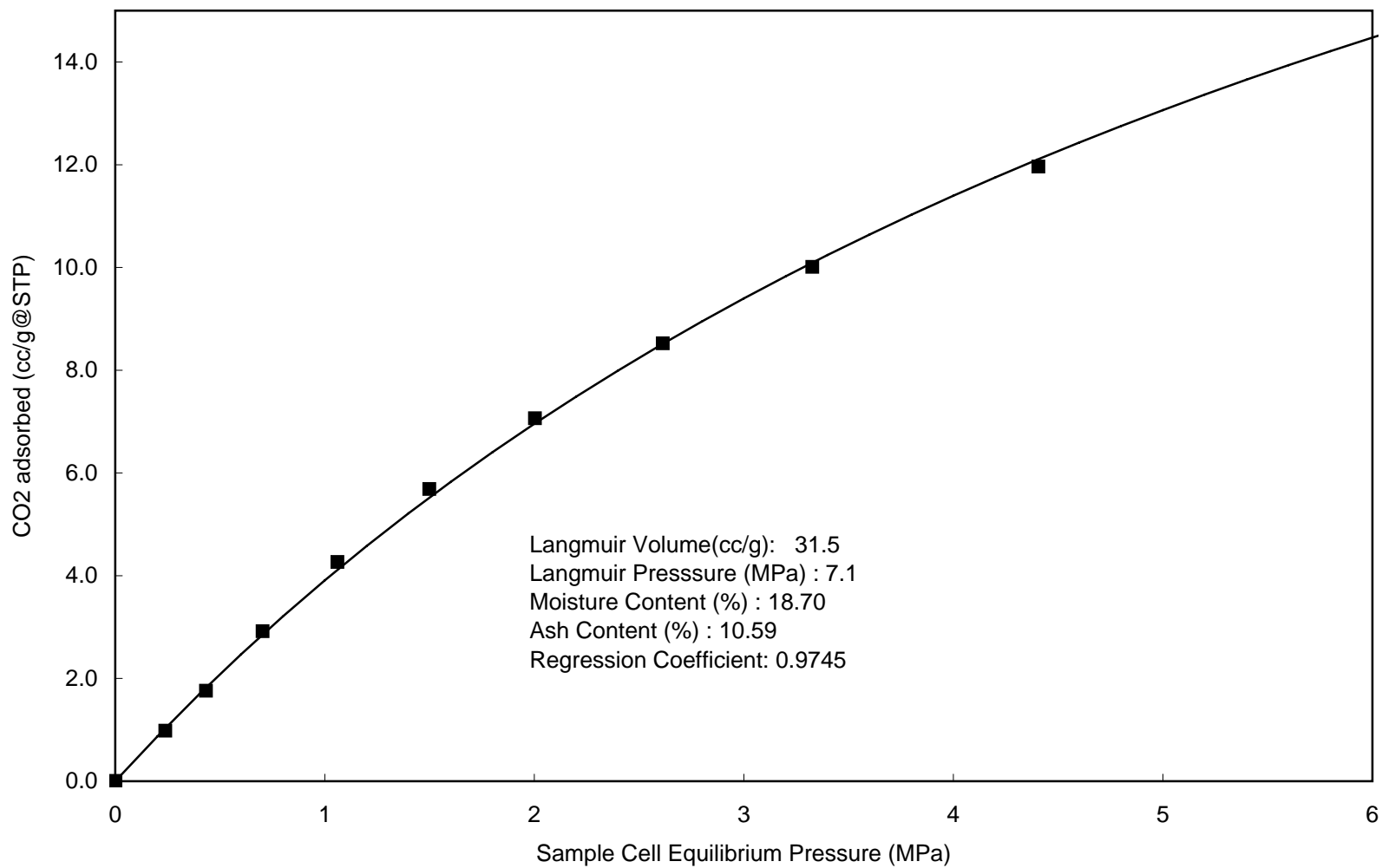
Saturated Monolayer Volume (cc/g):	38.75
Langmuir Pressure (MPa):	7.06

#### ASH FREE MOISTURE INCLUDED

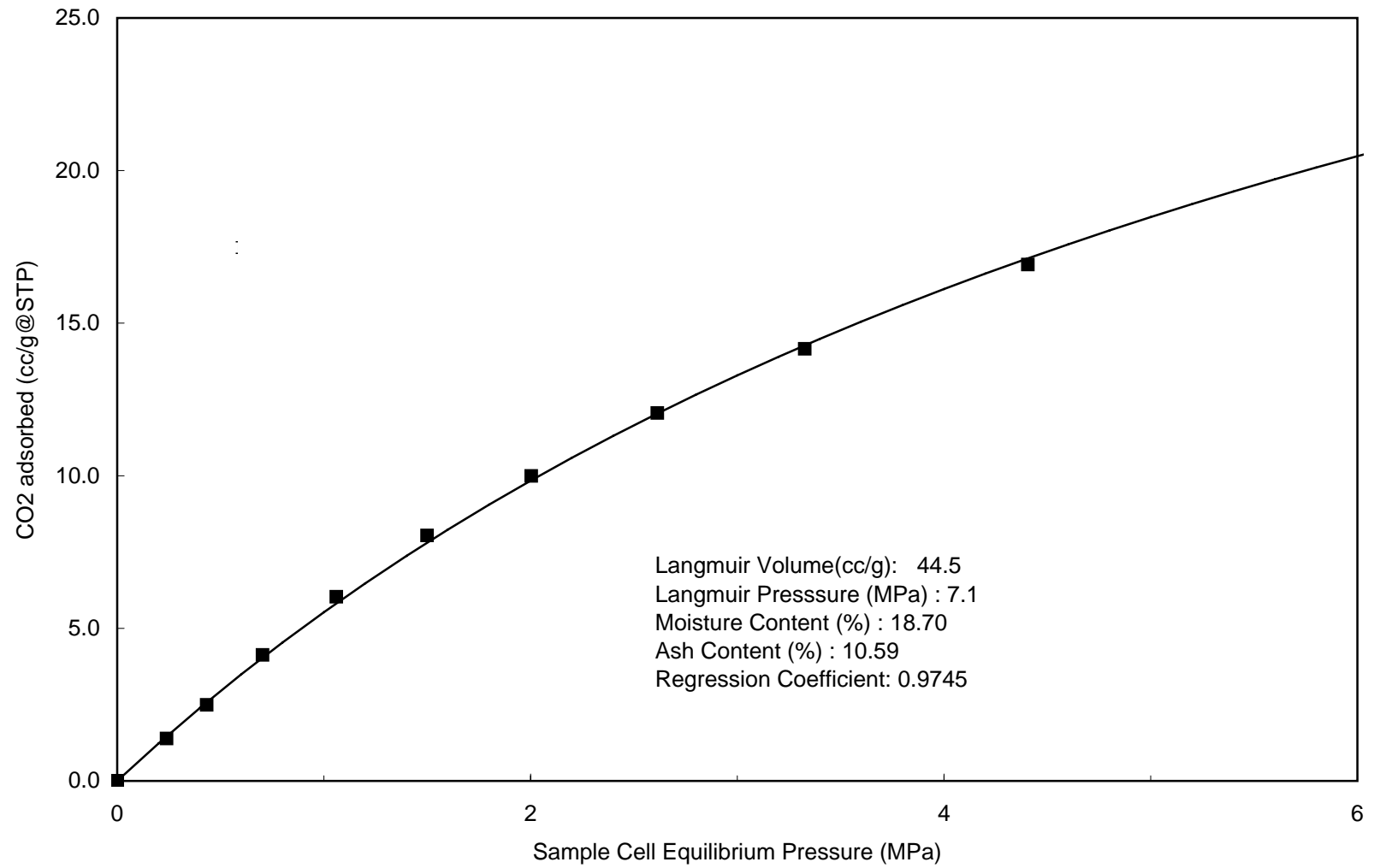
0.239	1.10	0.00
0.433	1.97	0.22
0.703	3.26	0.22
1.061	4.77	0.22
1.499	6.36	0.24
2.003	7.90	0.25
2.613	9.53	0.27
3.327	11.20	0.30
4.406	13.38	0.33

Saturated Monolayer Volume (cc/g, ash free):	35.23
Langmuir Pressure (MPa):	7.06
Correlation Coefficient:	0.9745

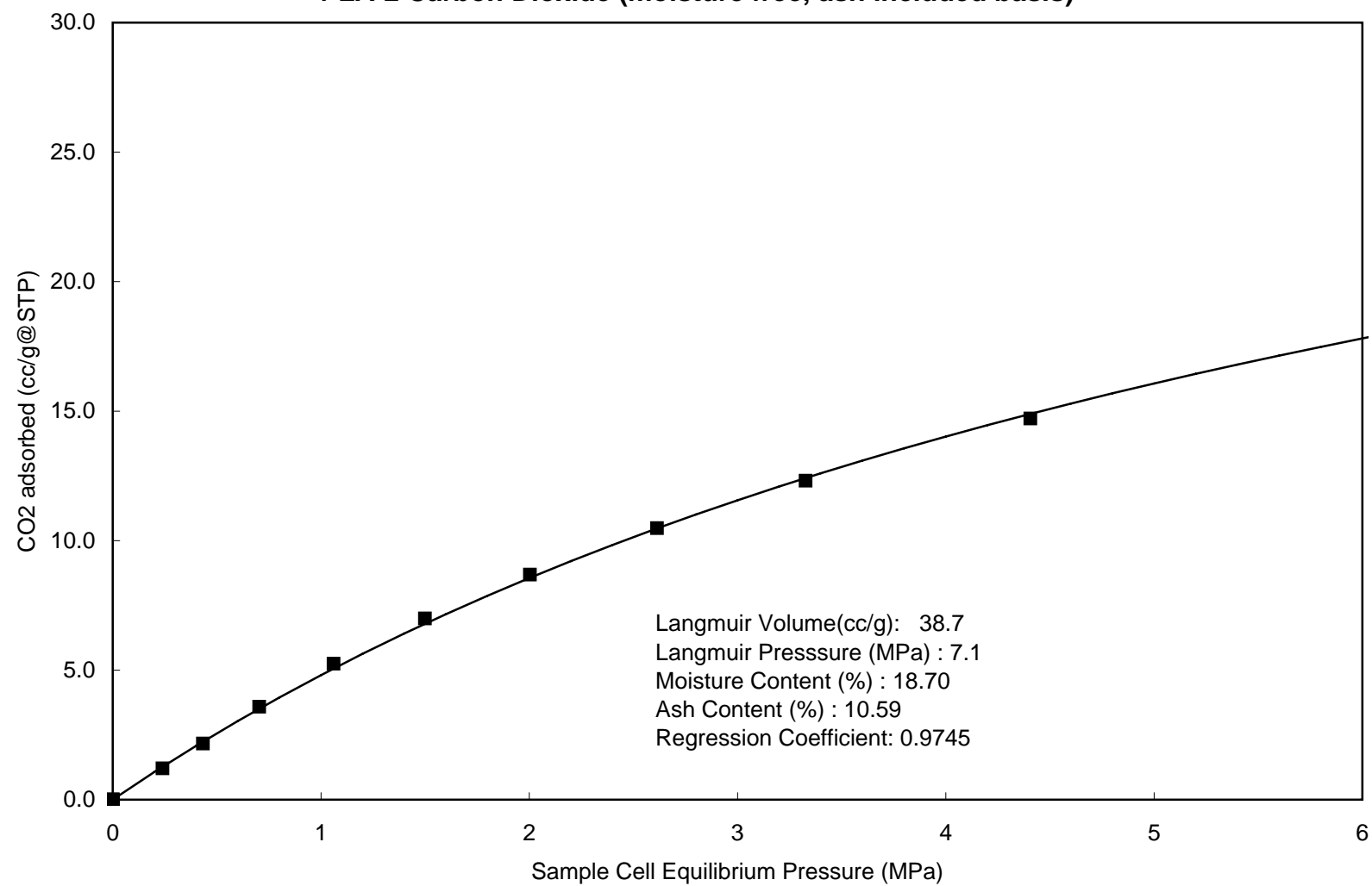
### 4-LA-2 Carbon Dioxide (as received basis)



### 4-LA-2 Carbon Dioxide (dry & ash free basis)

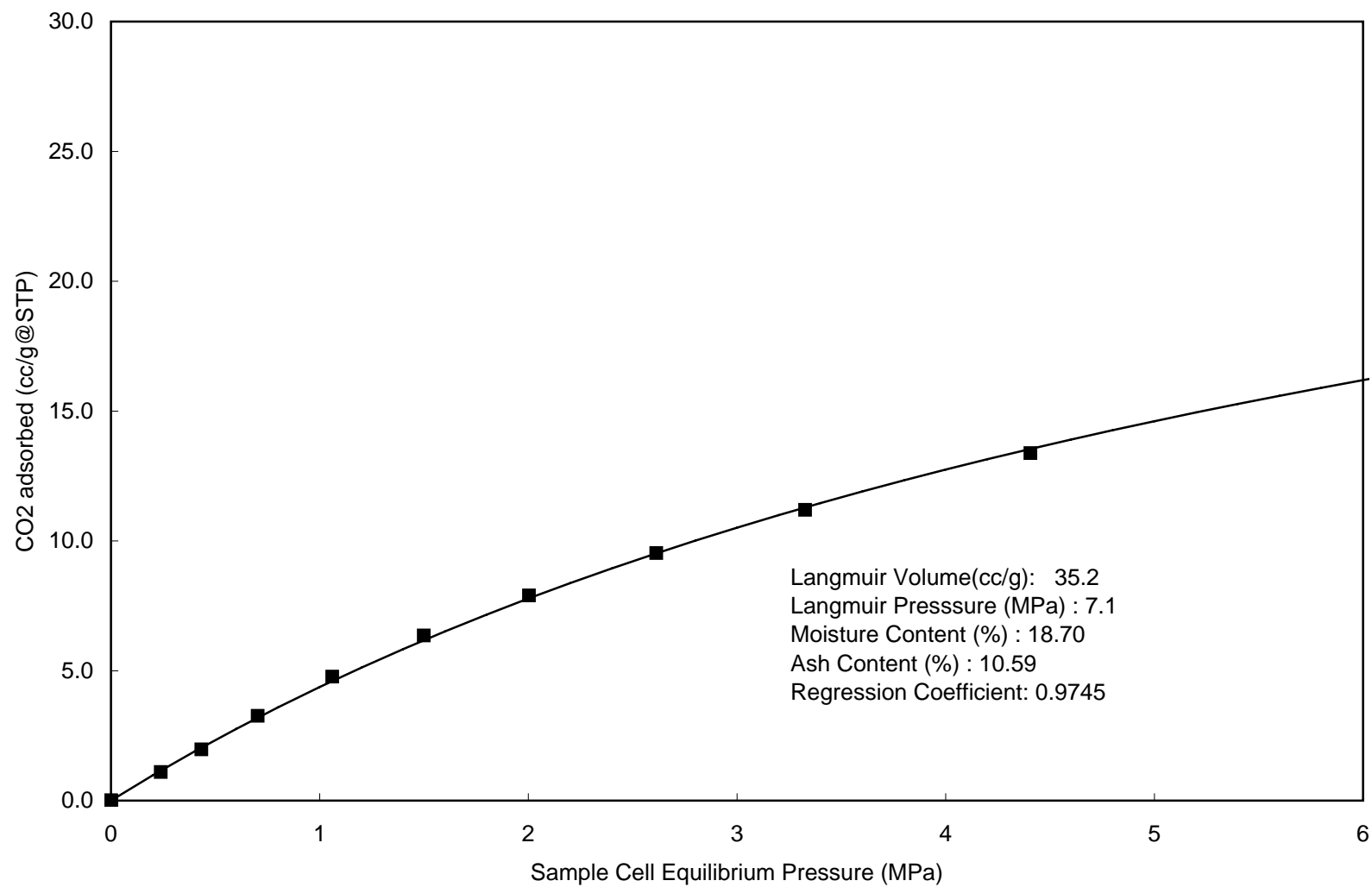


#### 4-LA-2 Carbon Dioxide (moisture free, ash included basis)





### 4-LA-2 Carbon Dioxide (ash free, moisture included basis)



## Adsorption Langmuir Plot

