

Sample: TiO₂ sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM	Analysis Adsorptive: N ₂
Completed: 9/8/2013 11:24:47AM	Analysis Bath Temp.: -195.545 °C
Report Time: 9/10/2013 3:55:56PM	Thermal Correction: No
Sample Mass: 0.1500 g	Warm Free Space: 22.3488 cm ³ Measured
Cold Free Space: 71.4897 cm ³	Equilibration Interval: 10 s
Low Pressure Dose: 10.000 cm ³ /g STP	Automatic Degas: Yes

Summary Report

Surface Area

Single point surface area at P/P₀ = 0.267140257: 146.4284 m²/g

BET Surface Area: 152.7854 m²/g

Langmuir Surface Area: 234.2976 m²/g

t-Plot External Surface Area: 169.4130 m²/g

BJH Adsorption cumulative surface area of pores
between 17.000 Å and 3000.000 Å diameter: 180.913 m²/g

BJH Desorption cumulative surface area of pores
between 17.000 Å and 3000.000 Å diameter: 202.4154 m²/g

Pore Volume

Single point adsorption total pore volume of pores
less than 2544.799 Å diameter at P/P₀ = 0.992354890: 0.377535 cm³/g

t-Plot micropore volume: -0.010437 cm³/g

BJH Adsorption cumulative volume of pores
between 17.000 Å and 3000.000 Å diameter: 0.371744 cm³/g

BJH Desorption cumulative volume of pores
between 17.000 Å and 3000.000 Å diameter: 0.382014 cm³/g

Pore Size

Adsorption average pore width (4V/A by BET): 98.8407 Å

BJH Adsorption average pore diameter (4V/A): 82.193 Å

BJH Desorption average pore diameter (4V/A): 75.491 Å

Dubinin-Astakhov

Micropore surface area: 140.809008 m²/g

Limiting micropore volume: 0.067891 cm³/g

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Isotherm Tabular Report

Relative Pressure (P/Po)	Absolute Pressure (mmHg)	Quantity Adsorbed (cm ³ /g STP)	Elapsed Time (h:min)	Saturation Pressure (mmHg)
			01:59	781.430359
0.002536002	1.982602	19.0558	02:42	
0.002780767	2.174092	19.3259	02:48	
0.003196412	2.499239	19.7310	02:55	
0.003770907	2.948616	20.2096	03:01	
0.004270214	3.339288	20.5691	03:08	
0.004798800	3.752836	20.9059	03:13	
0.005322715	4.162819	21.2053	03:19	
0.005845819	4.572170	21.4772	03:24	
0.006368847	4.981505	21.7277	03:29	
0.007631677	5.969562	22.2625	03:34	
0.008005221	6.261948	22.4000	03:37	
0.009231774	7.221776	22.8511	03:42	
0.010498991	8.213517	23.2275	03:47	
0.026536240	20.761000	26.3817	03:53	
0.041583555	32.534840	28.2848	03:57	
0.057555148	45.032848	29.9415	04:01	
			04:03	782.445923
0.073913018	57.835327	31.4132	04:07	
0.090121294	70.520134	32.7756	04:10	
0.106854396	83.617279	34.1280	04:14	
0.138361143	108.275757	36.5354	04:17	
0.170946918	133.781570	38.9445	04:21	
0.202902941	158.796631	41.2593	04:25	
0.235109036	184.009476	43.5887	04:29	
0.267140257	209.085373	45.8982	04:32	
0.300339603	235.079544	48.3085	04:36	
0.342895743	268.399841	51.4388	04:40	
0.386229519	302.331604	54.7312	04:44	
0.407820531	319.245728	56.4356	04:48	
0.428323277	335.305847	58.1071	04:51	
0.470426022	368.280487	61.7011	04:55	
0.513456496	401.988312	65.8090	05:00	
0.525060144	411.085602	67.0199	05:03	
0.535919422	419.600647	68.1968	05:06	
0.545849615	427.388763	69.3280	05:09	
0.557470319	436.501038	70.6686	05:12	
0.595655715	466.424377	75.5179	05:17	
0.641318020	502.211029	82.6685	05:23	
0.684841975	536.333008	91.4637	05:30	
0.707622801	554.208069	97.2601	05:36	
0.728132150	570.306213	103.3602	05:42	
0.764537718	598.876282	117.3460	05:51	
0.807616148	632.698669	142.8633	06:03	
			06:04	783.423157

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Isotherm Tabular Report

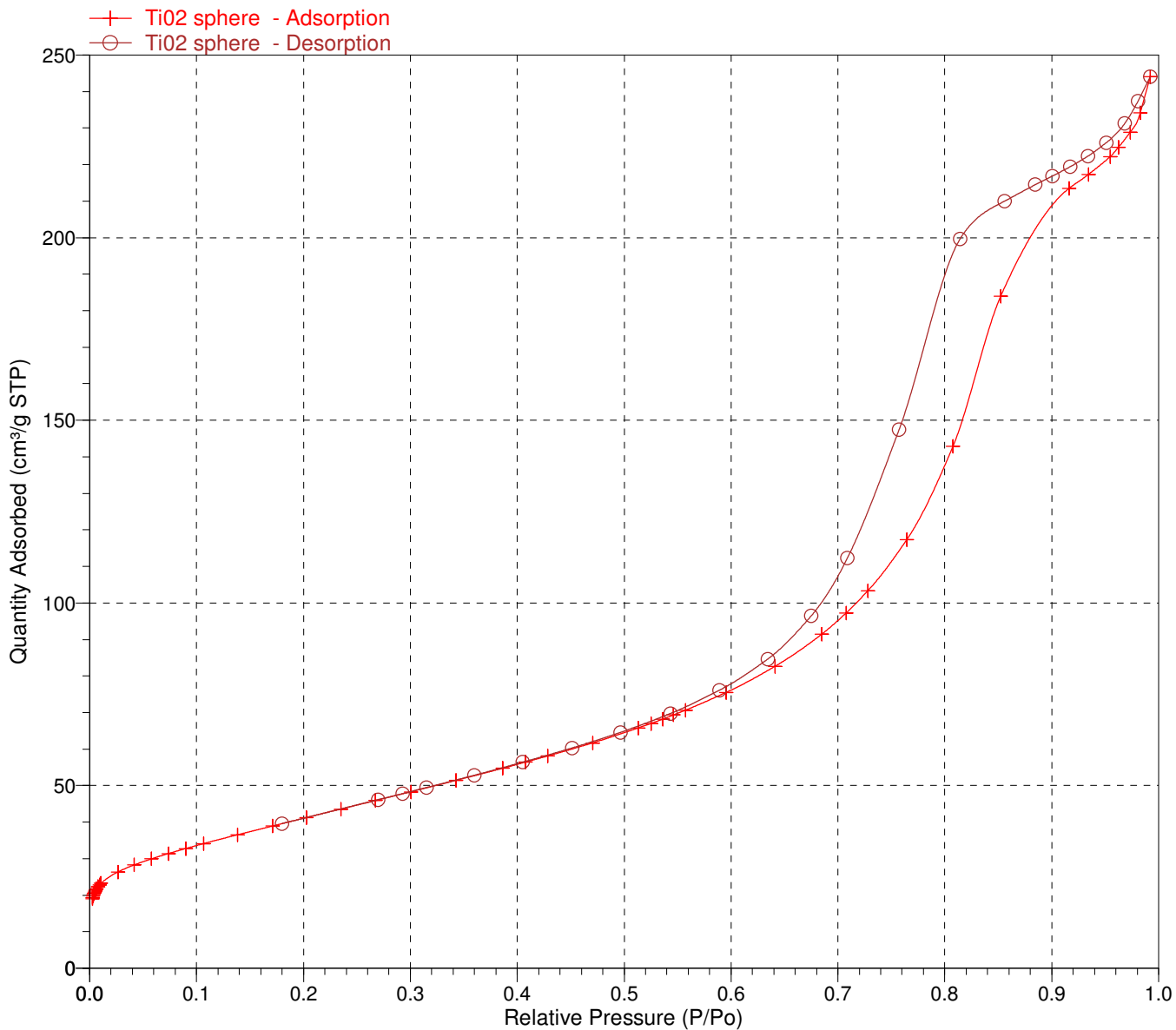
Relative Pressure (P/Po)	Absolute Pressure (mmHg)	Quantity Adsorbed (cm ³ /g STP)	Elapsed Time (h:min)	Saturation Pressure (mmHg)
0.852440802	667.911804	184.0158	06:19	
0.916409014	718.103638	213.5208	06:30	
0.934590003	732.383240	217.3444	06:35	
0.954504518	748.022644	222.1830	06:40	
0.962811618	754.553040	224.8159	06:43	
0.973449562	762.917358	228.8826	06:47	
0.982968352	770.412048	234.2181	06:52	
0.992354890	777.810730	244.0750	06:58	
0.980682322	768.703125	237.4155	07:04	
0.968345414	759.066956	231.2562	07:09	
0.951290247	745.731201	226.0284	07:14	
0.934134358	732.308716	222.3413	07:18	
0.917479521	719.278076	219.4265	07:22	
0.900904042	706.308716	216.8589	07:26	
0.884788201	693.698792	214.4796	07:30	
0.855904489	671.083252	210.0038	07:35	
0.814129779	638.369324	199.6922	07:42	
0.757038895	593.774048	147.3888	08:14	
			08:15	784.344604
0.708986637	556.089844	112.2605	08:31	
0.674795198	529.271973	96.4573	08:43	
0.634309939	497.517578	84.6491	08:52	
0.589285045	462.202545	76.1302	08:59	
0.543204877	426.059814	69.7506	09:05	
0.496680493	389.568665	64.5858	09:10	
0.451285502	353.963348	60.3085	09:15	
0.405337778	317.924500	56.4169	09:19	
0.360008698	282.370880	52.8305	09:23	
0.315261182	247.273407	49.4699	09:28	
0.292592420	229.493286	47.8055	09:31	
0.269941245	211.726959	46.1469	09:34	
0.179830584	141.049149	39.6082	09:39	

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Isotherm Linear Plot

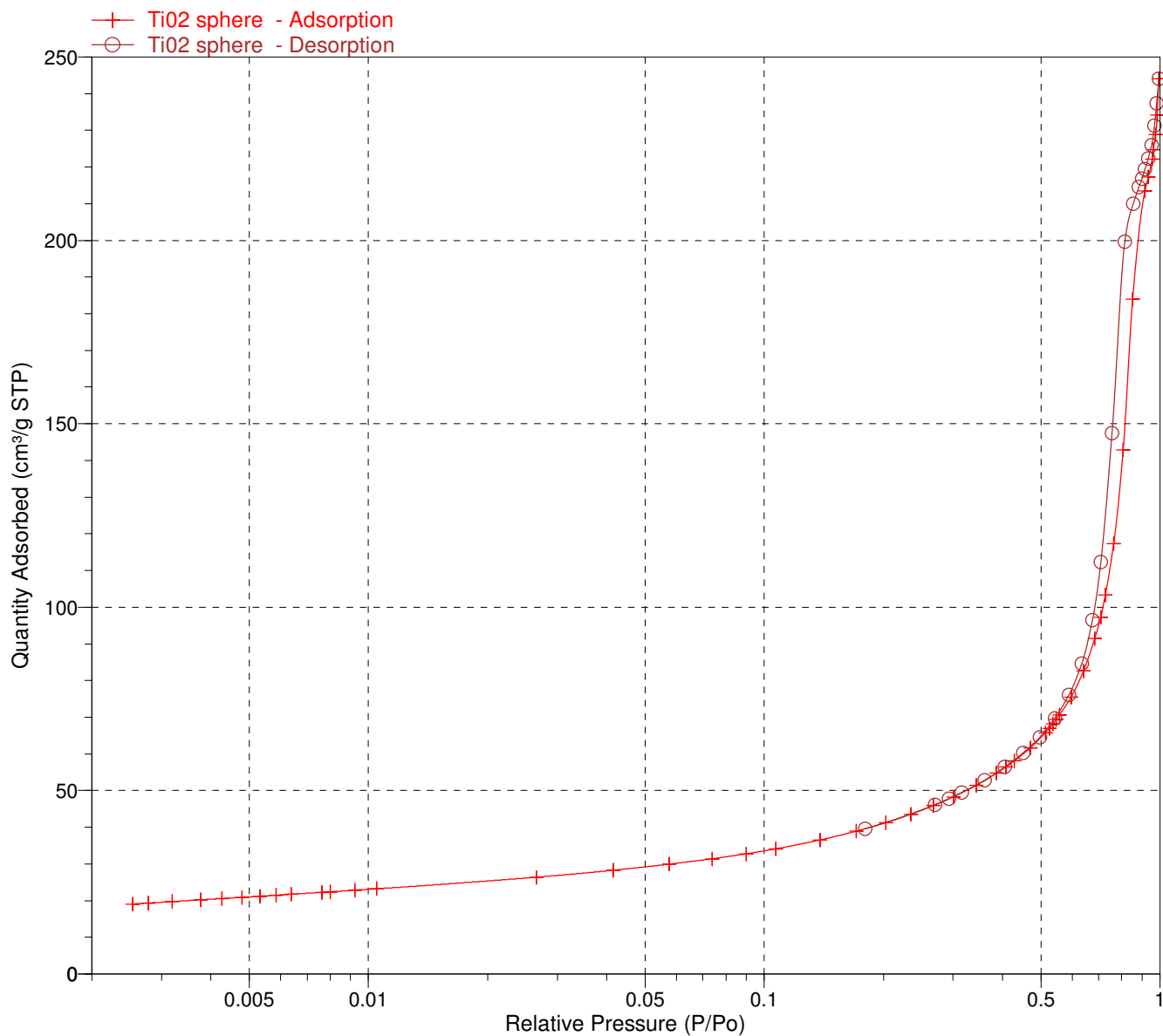


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Isotherm Log Plot



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Low Pressure Dose: 10.000 cm ³ /g STP	Automatic Degas: Yes

BET Surface Area Report

BET Surface Area: 152.7854 ± 0.8223 m²/g
 Slope: 0.028009 ± 0.000151 g/cm³ STP
 Y-Intercept: 0.000483 ± 0.000025 g/cm³ STP
 C: 58.987954
 Qm: 35.0973 cm³/g STP
 Correlation Coefficient: 0.9998979
 Molecular Cross-Sectional Area: 0.1620 nm²

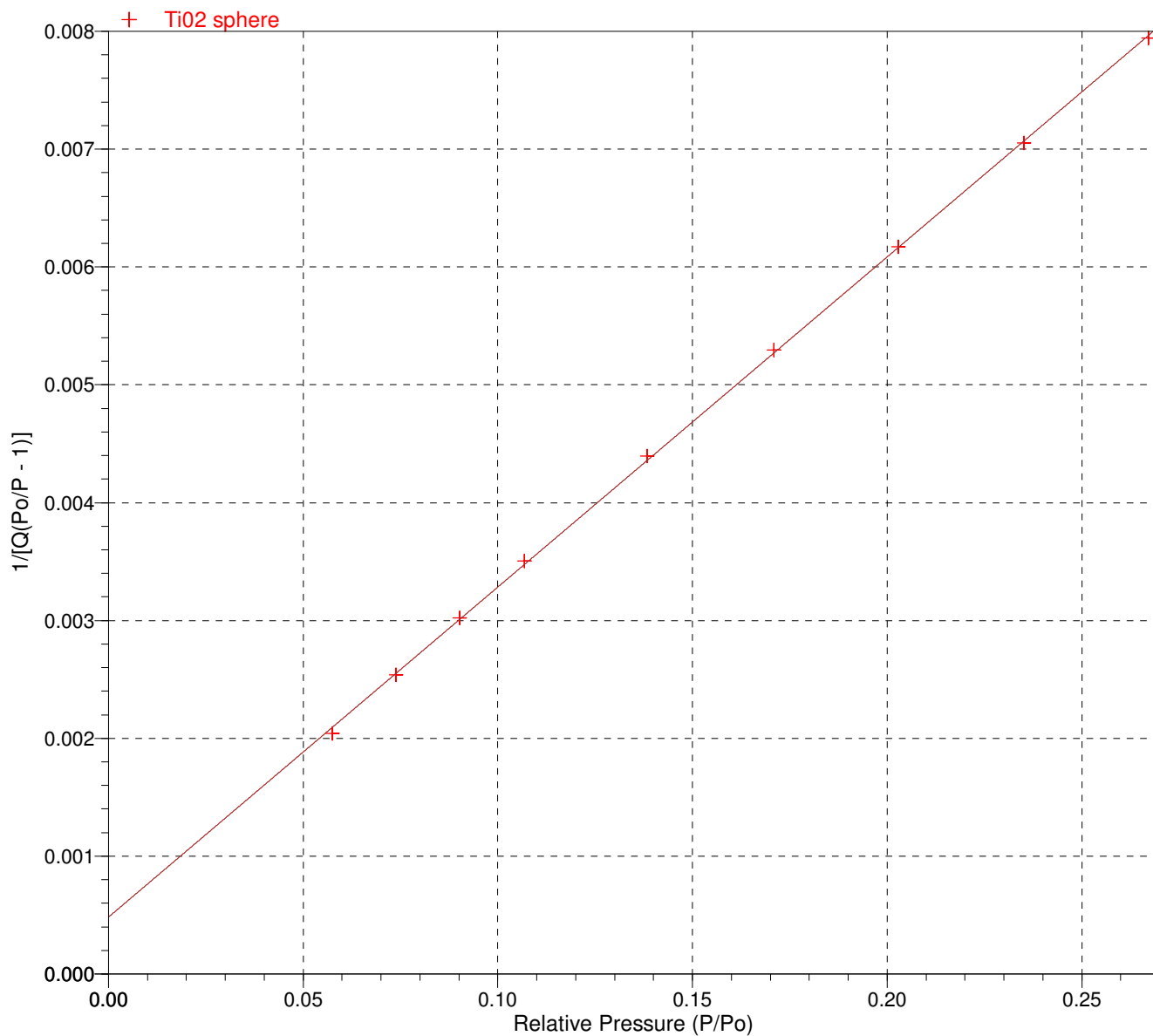
Relative Pressure (P/Po)	Quantity Adsorbed (cm ³ /g STP)	1/[Q(Po/P - 1)]
0.057555148	29.9415	0.002040
0.073913018	31.4132	0.002541
0.090121294	32.7756	0.003022
0.106854396	34.1280	0.003506
0.138361143	36.5354	0.004395
0.170946918	38.9445	0.005295
0.202902941	41.2593	0.006170
0.235109036	43.5887	0.007052
0.267140257	45.8982	0.007942

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BET Surface Area Plot



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Langmuir Surface Area Report

Langmuir Surface Area: 234.2976 ± 8.9320 m²/g
 Slope: 0.018580 ± 0.000708 g/cm³ STP
 Y-Intercept: 0.827197 ± 0.091367 mmHg·g/cm³ STP
 b: 0.022461 1/mmHg
 Qm: 53.8219 cm³/g STP
 Correlation Coefficient: 0.994952
 Molecular Cross-Sectional Area: 0.1620 nm²

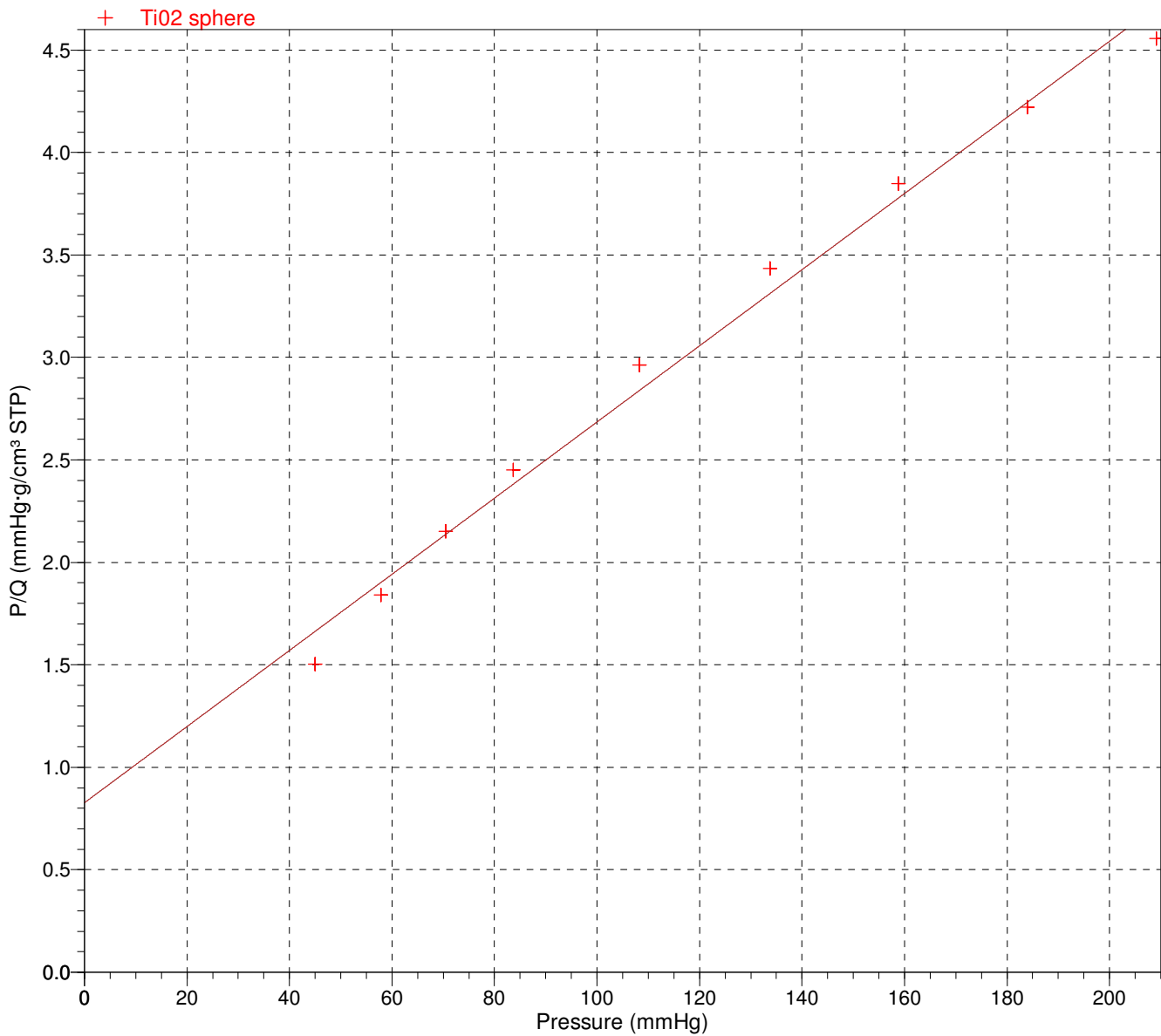
Pressure (mmHg)	Quantity Adsorbed (cm ³ /g STP)	P/Q (mmHg·g/cm ³ STP)
45.032848	29.9415	1.504
57.835327	31.4132	1.841
70.520134	32.7756	2.152
83.617279	34.1280	2.450
108.275757	36.5354	2.964
133.781570	38.9445	3.435
158.796631	41.2593	3.849
184.009476	43.5887	4.221
209.085373	45.8982	4.555

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Langmuir Surface Area Plot



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t-Plot Report

Micropore Volume: -0.010437 cm³/g
 Micropore Area: *
 External Surface Area: 169.4130 m²/g
 Slope: 10.952484 ± 0.067459 cm³/g·Å STP
 Y-Intercept: -6.747158 ± 0.283247 cm³/g STP
 Correlation Coefficient: 0.999905
 Surface Area Correction Factor: 1.000
 Density Conversion Factor: 0.0015468
 Total Surface Area (BET): 152.7854 m²/g
 Thickness Range: 3.5000 Å to 5.0000 Å
 Thickness Equation: Harkins and Jura

$$t = [13.99 / (0.034 - \log(P/P_o))] ^{0.5}$$

Relative Pressure (P/P _o)	Statistical Thickness (Å)	Quantity Adsorbed (cm ³ /g STP)
0.002536002	2.3064	19.0558
0.002780767	2.3242	19.3259
0.003196412	2.3518	19.7310
0.003770907	2.3859	20.2096
0.004270214	2.4126	20.5691
0.004798800	2.4384	20.9059
0.005322715	2.4621	21.2053
0.005845819	2.4841	21.4772
0.006368847	2.5047	21.7277
0.007631677	2.5501	22.2625
0.008005221	2.5624	22.4000
0.009231774	2.6005	22.8511
0.010498991	2.6363	23.2275
0.026536240	2.9476	26.3817
0.041583555	3.1443	28.2848
0.057555148	3.3139	29.9415
0.073913018	3.4649	31.4132
0.090121294	3.6005	32.7756
0.106854396	3.7306	34.1280
0.138361143	3.9581	36.5354
0.170946918	4.1788	38.9445
0.202902941	4.3876	41.2593
0.235109036	4.5945	43.5887
0.267140257	4.7998	45.8982
0.300339603	5.0144	48.3085
0.342895743	5.2958	51.4388
0.386229519	5.5935	54.7312
0.407820531	5.7473	56.4356
0.428323277	5.8976	58.1071
0.470426022	6.2208	61.7011
0.513456496	6.5762	65.8090

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Relative Pressure (P/Po)	Statistical Thickness (Å)	Quantity Adsorbed (cm ³ /g STP)
0.525060144	6.6771	67.0199
0.535919422	6.7738	68.1968
0.545849615	6.8641	69.3280
0.557470319	6.9724	70.6686
0.595655715	7.3495	75.5179
0.641318020	7.8517	82.6685
0.684841975	8.3971	91.4637

* The micropore area is not reported because either the micropore volume is negative or the calculated external surface area is larger than the total surface area.

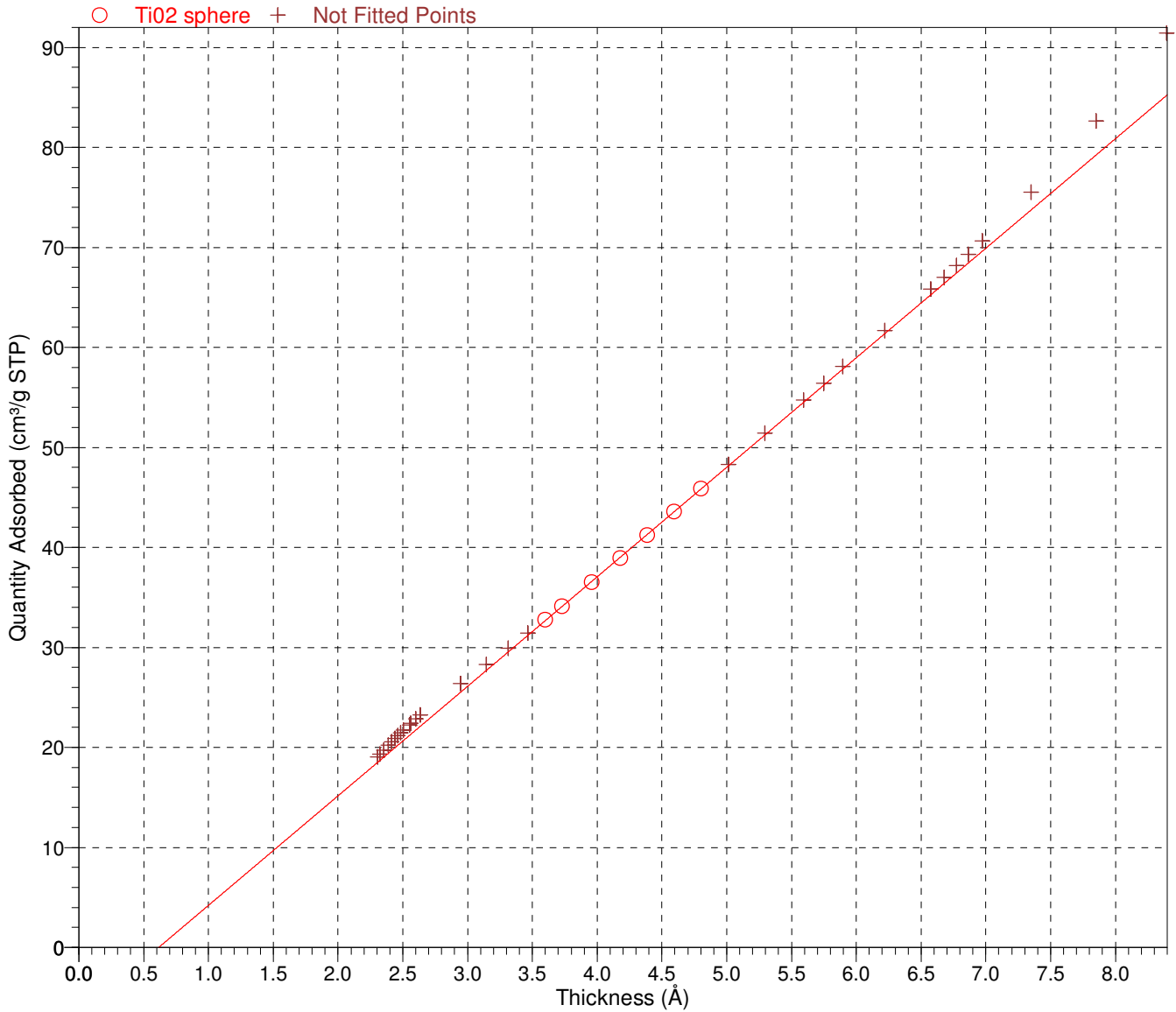
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t-Plot

Harkins and Jura



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BJH Adsorption Pore Distribution Report

Faas Correction

Halsey

$$t = 3.54 [-5 / \ln(P/P_0)] ^{0.333}$$

Diameter Range: 17.000 Å to 3000.000 Å

Adsorbate Property Factor: 9.53000 Å

Density Conversion Factor: 0.0015468

Fraction of Pores Open at Both Ends: 0.00

Pore Diameter Range (Å)	Average Diameter (Å)	Incremental Pore Volume (cm ³ /g)	Cumulative Pore Volume (cm ³ /g)	Incremental Pore Area (m ² /g)	Cumulative Pore Area (m ² /g)
2541.2 - 1152.8	1384.4	0.016246	0.016246	0.469	0.469
1152.8 - 745.1	863.3	0.008842	0.025088	0.410	0.879
745.1 - 535.3	605.8	0.006815	0.031903	0.450	1.329
535.3 - 439.4	477.7	0.004463	0.036367	0.374	1.703
439.4 - 307.9	350.2	0.008363	0.044729	0.955	2.658
307.9 - 242.0	266.8	0.006755	0.051484	1.013	3.671
242.0 - 138.1	162.2	0.057218	0.108702	14.109	17.780
138.1 - 105.9	117.5	0.084180	0.192882	28.667	46.447
105.9 - 86.2	93.8	0.051846	0.244728	22.102	68.548
86.2 - 74.2	79.2	0.027558	0.272286	13.913	82.461
74.2 - 68.8	71.3	0.011675	0.283961	6.552	89.013
68.8 - 63.5	65.9	0.010894	0.294855	6.612	95.625
63.5 - 55.2	58.7	0.015958	0.310812	10.875	106.500
55.2 - 48.3	51.2	0.012261	0.323073	9.576	116.076
48.3 - 43.5	45.6	0.007773	0.330846	6.816	122.892
43.5 - 42.2	42.8	0.002075	0.332921	1.937	124.829
42.2 - 41.1	41.7	0.001762	0.334683	1.691	126.520
41.1 - 40.0	40.6	0.001787	0.336470	1.762	128.283
40.0 - 38.9	39.4	0.001810	0.338280	1.836	130.118
38.9 - 35.0	36.7	0.005893	0.344172	6.422	136.541
35.0 - 31.7	33.2	0.004839	0.349011	5.838	142.378
31.7 - 30.2	30.9	0.002207	0.351218	2.855	145.234
30.2 - 28.8	29.5	0.002206	0.353425	2.996	148.230
28.8 - 26.1	27.3	0.004163	0.357587	6.107	154.338
26.1 - 23.7	24.7	0.003841	0.361429	6.215	160.553
23.7 - 21.9	22.7	0.002878	0.364307	5.072	165.624
21.9 - 20.3	21.0	0.002648	0.366954	5.037	170.661
20.3 - 18.7	19.4	0.002533	0.369488	5.212	175.874
18.7 - 17.2	17.9	0.002256	0.371744	5.039	180.913

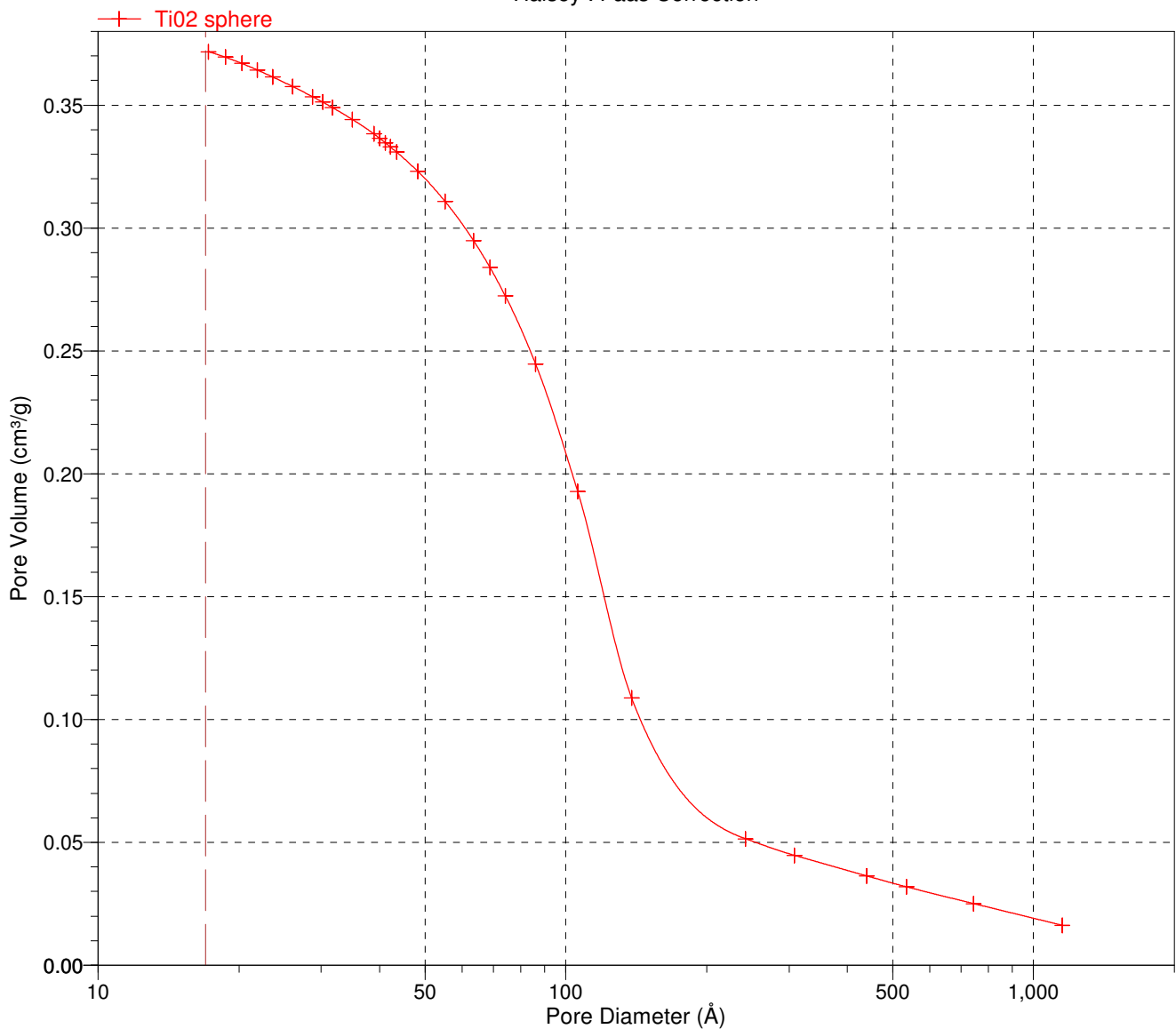
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BJH Adsorption Cumulative Pore Volume

Halsey : Faas Correction



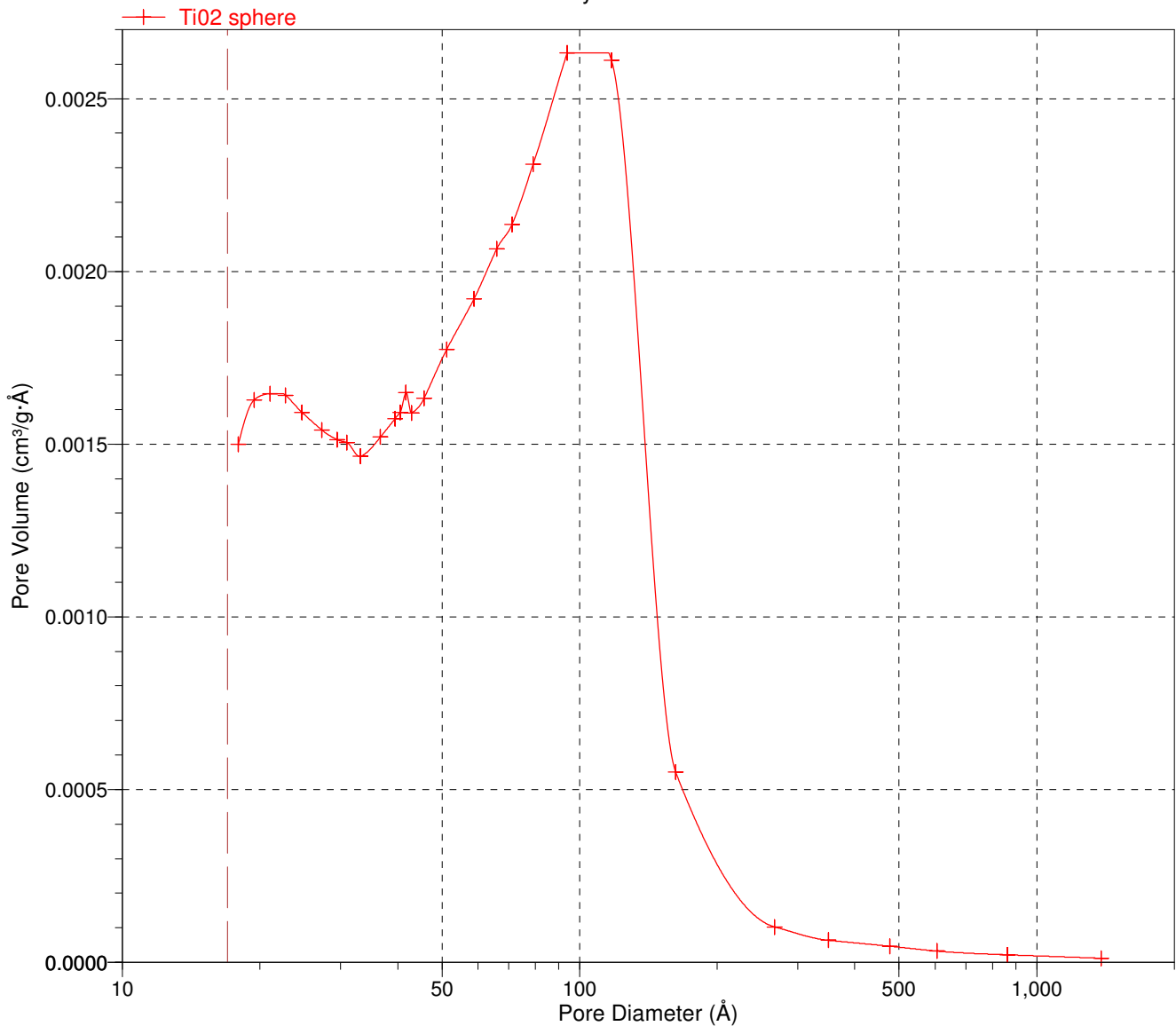
Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
Completed: 9/8/2013 11:24:47AM
Report Time: 9/10/2013 3:55:56PM
Sample Mass: 0.1500 g
Cold Free Space: 71.4897 cm³
Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

BJH Adsorption dV/dD Pore Volume

Halsey : Faas Correction



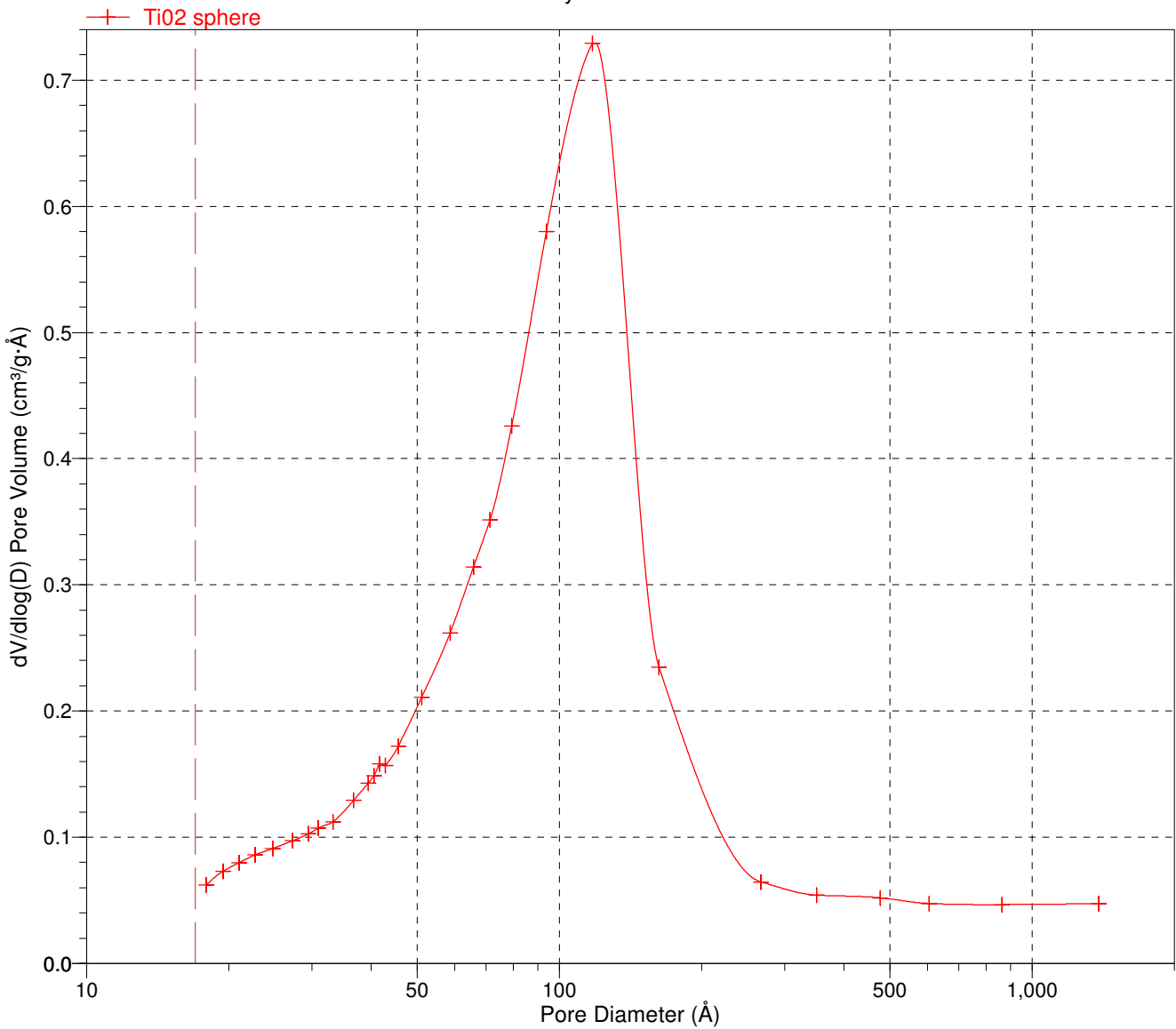
Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
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Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

BJH Adsorption dV/dlog(D) Pore Volume

Halsey : Faas Correction



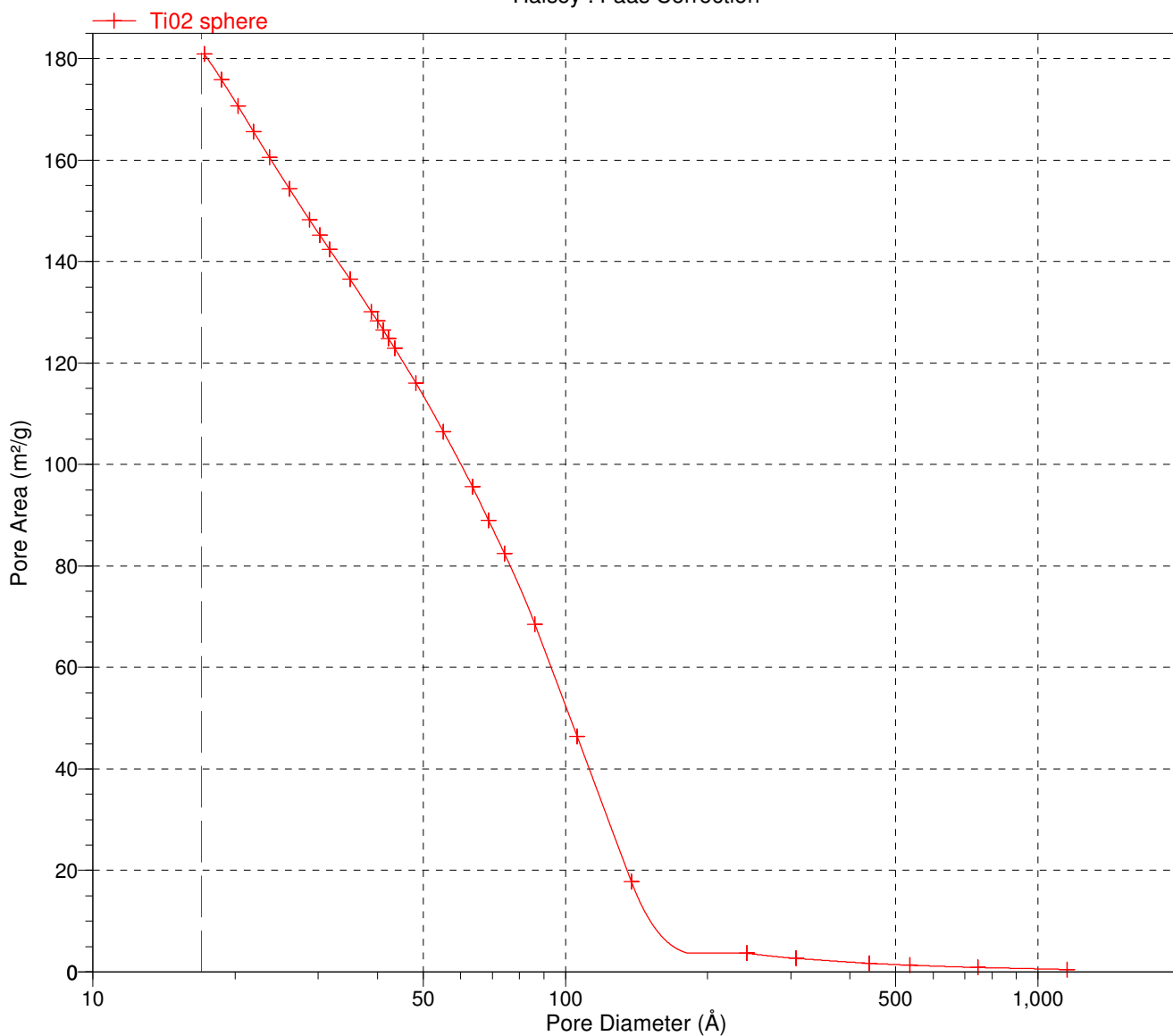
Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krak
File: C:\2020\DATA\001-409.SMP

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Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

BJH Adsorption Cumulative Pore Area

Halsey : Faas Correction



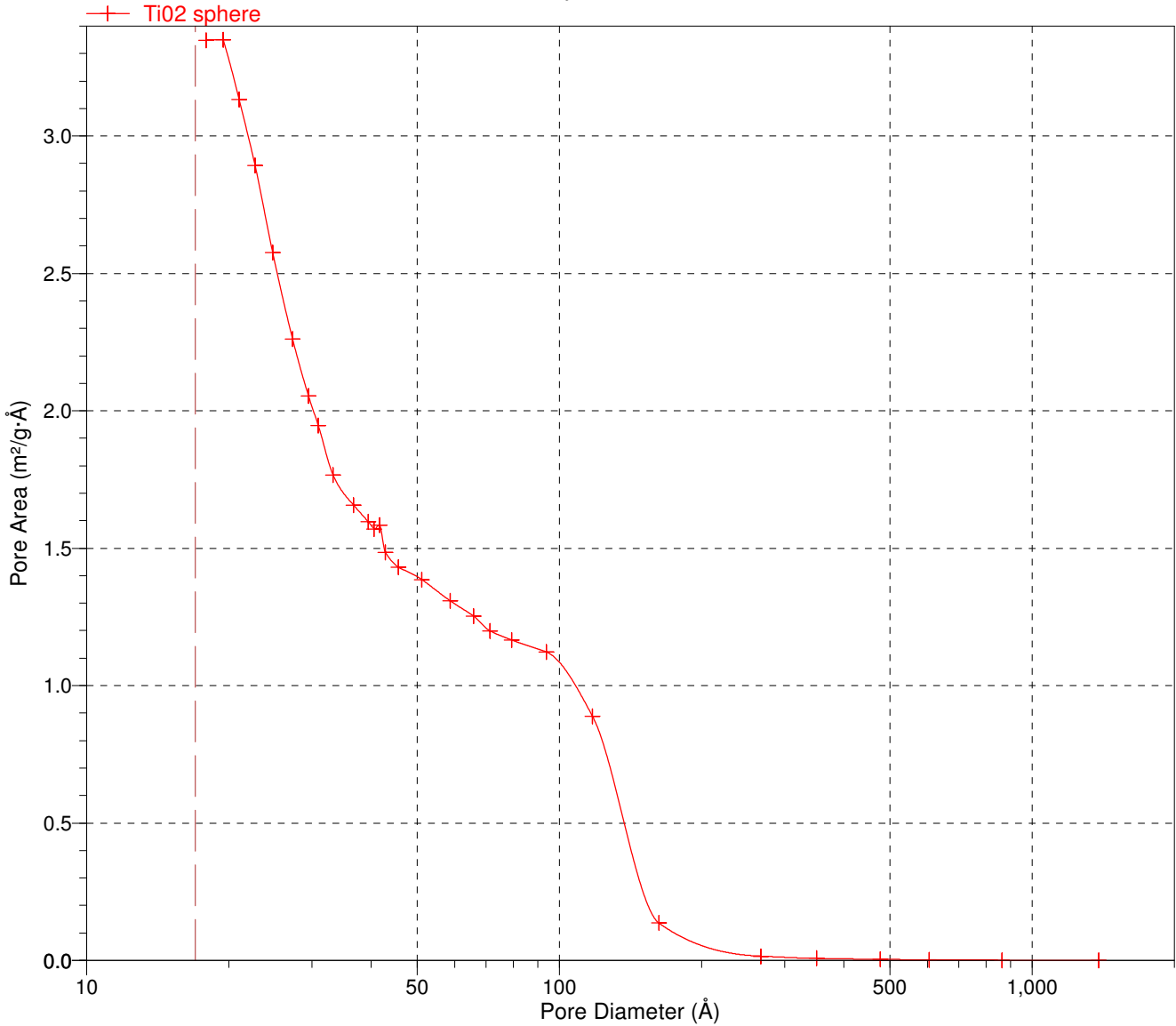
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Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

BJH Adsorption dA/dD Pore Area

Halsey : Faas Correction



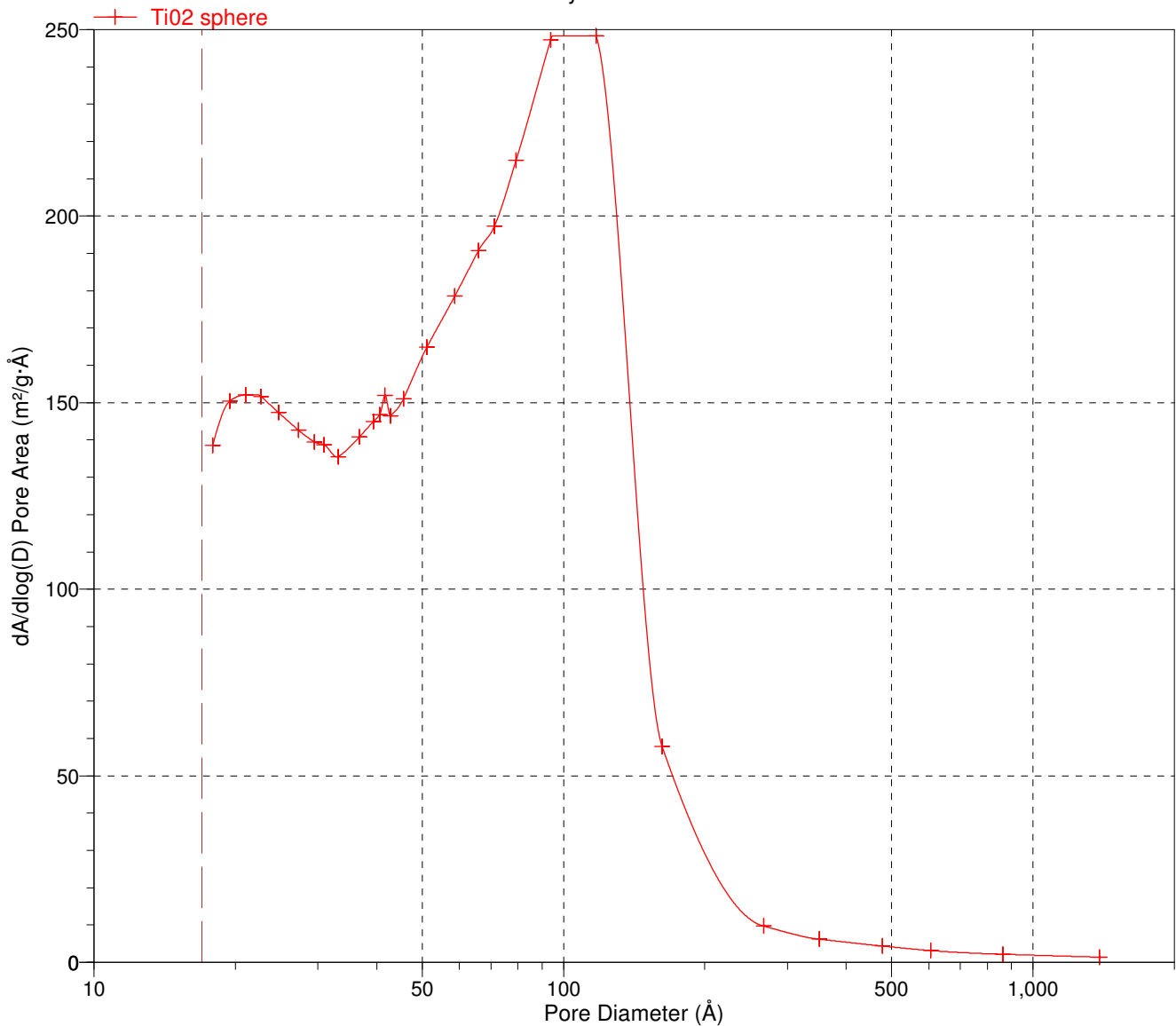
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Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

BJH Adsorption dA/dlog(D) Pore Area

Halsey : Faas Correction



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 Operator: Ariharan
 Submitter: Prof.krak
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Analysis Adsorptive: N2
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 Thermal Correction: No
 Warm Free Space: 22.3488 cm³ Measured
 Equilibration Interval: 10 s
 Automatic Degas: Yes

BJH Desorption Pore Distribution Report

Faas Correction

Halsey

$$t = 3.54 [-5 / \ln(P/P_0)] ^{0.333}$$

Diameter Range: 17.000 Å to 3000.000 Å

Adsorbate Property Factor: 9.53000 Å

Density Conversion Factor: 0.0015468

Fraction of Pores Open at Both Ends: 0.00

Pore Diameter Range (Å)	Average Diameter (Å)	Incremental Pore Volume (cm ³ /g)	Cumulative Pore Volume (cm ³ /g)	Incremental Pore Area (m ² /g)	Cumulative Pore Area (m ² /g)
2541.6 - 1018.8	1223.6	0.011041	0.011041	0.361	0.361
1018.8 - 627.4	732.9	0.010369	0.021410	0.566	0.927
627.4 - 411.3	474.9	0.008937	0.030347	0.753	1.680
411.3 - 306.2	343.0	0.006391	0.036738	0.745	2.425
306.2 - 245.5	268.9	0.005136	0.041874	0.764	3.189
245.5 - 205.2	221.5	0.004605	0.046478	0.831	4.020
205.2 - 176.9	188.8	0.004351	0.050830	0.922	4.942
176.9 - 141.8	155.3	0.008468	0.059297	2.182	7.124
141.8 - 110.0	121.6	0.020796	0.080093	6.839	13.963
110.0 - 83.8	93.1	0.114235	0.194329	49.070	63.033
83.8 - 69.5	75.2	0.077138	0.271467	41.030	104.063
69.5 - 61.8	65.1	0.033389	0.304856	20.501	124.564
61.8 - 54.4	57.6	0.023109	0.327964	16.052	140.616
54.4 - 47.8	50.6	0.014626	0.342591	11.552	152.167
47.8 - 42.3	44.7	0.009478	0.352069	8.482	160.650
42.3 - 37.7	39.7	0.006683	0.358752	6.734	167.383
37.7 - 33.8	35.5	0.004843	0.363595	5.453	172.836
33.8 - 30.5	31.9	0.004013	0.367608	5.026	177.862
30.5 - 27.5	28.8	0.003485	0.371093	4.840	182.702
27.5 - 24.9	26.0	0.003049	0.374142	4.685	187.387
24.9 - 23.6	24.2	0.001445	0.375587	2.386	189.773
23.6 - 22.4	23.0	0.001427	0.377013	2.481	192.253
22.4 - 18.0	19.7	0.005001	0.382014	10.162	202.415

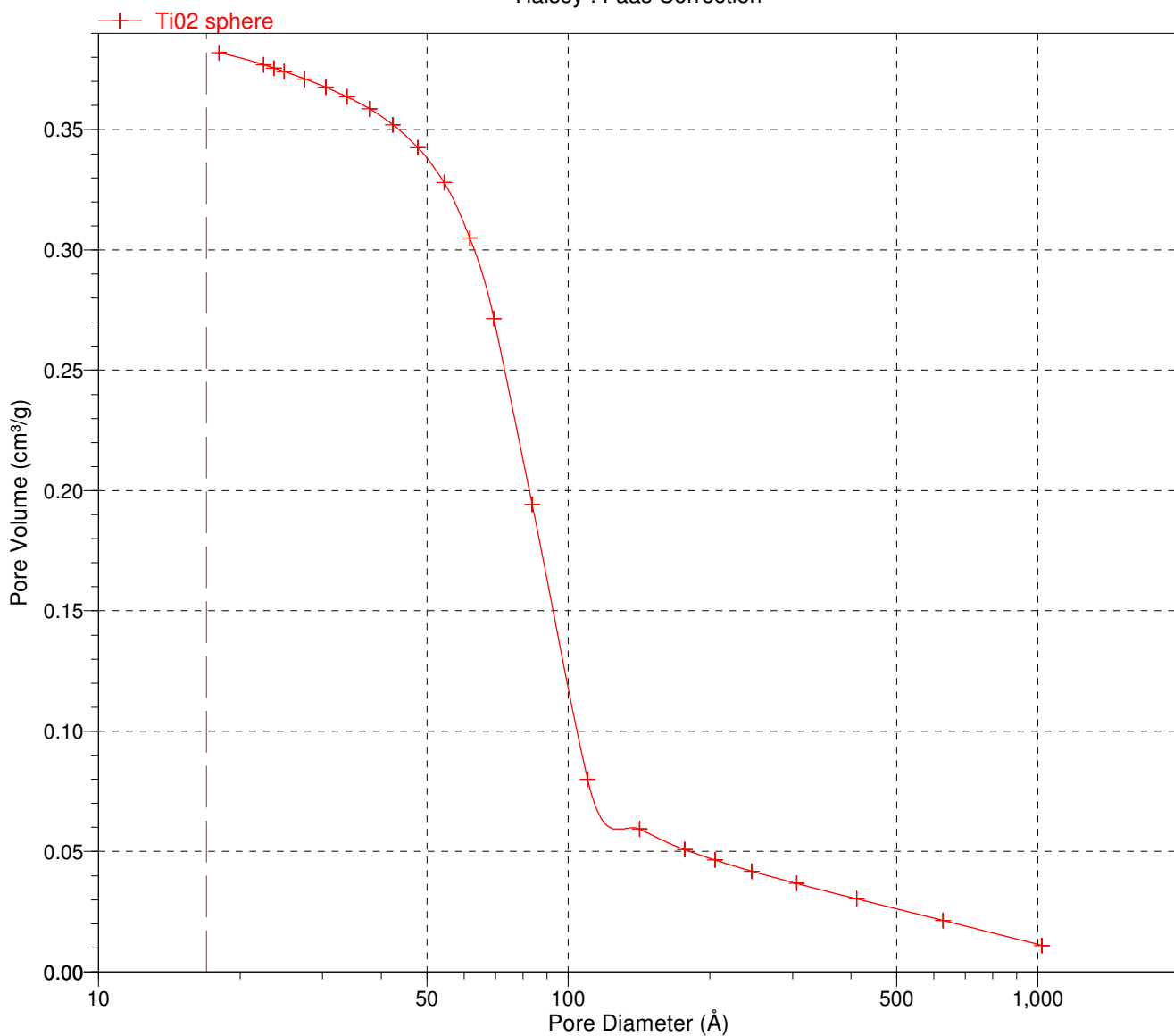
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 Thermal Correction: No
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 Equilibration Interval: 10 s
 Automatic Degas: Yes

BJH Desorption Cumulative Pore Volume

Halsey : Faas Correction



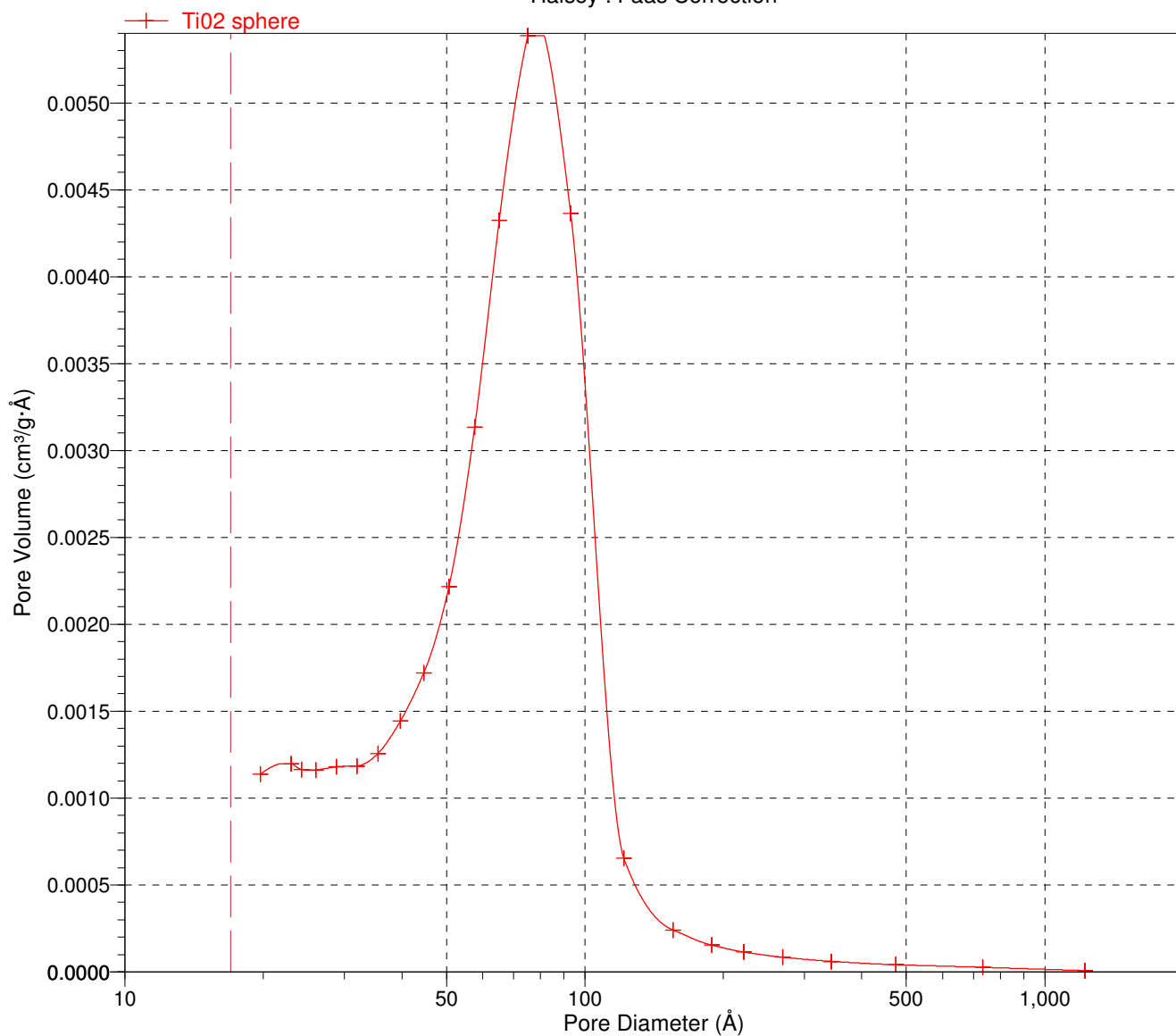
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BJH Desorption dV/dD Pore Volume

Halsey : Faas Correction



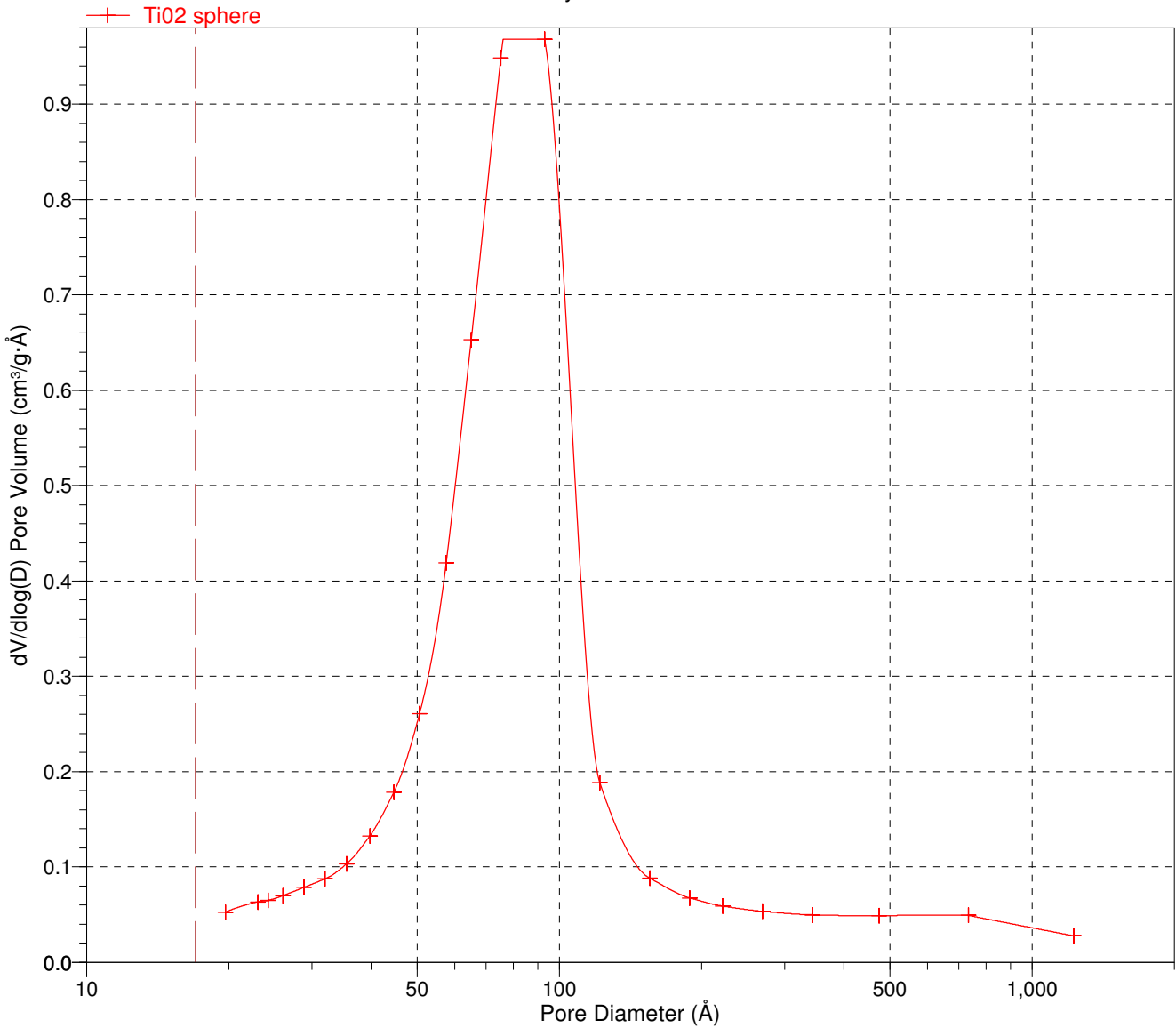
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Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

BJH Desorption dV/dlog(D) Pore Volume

Halsey : Faas Correction



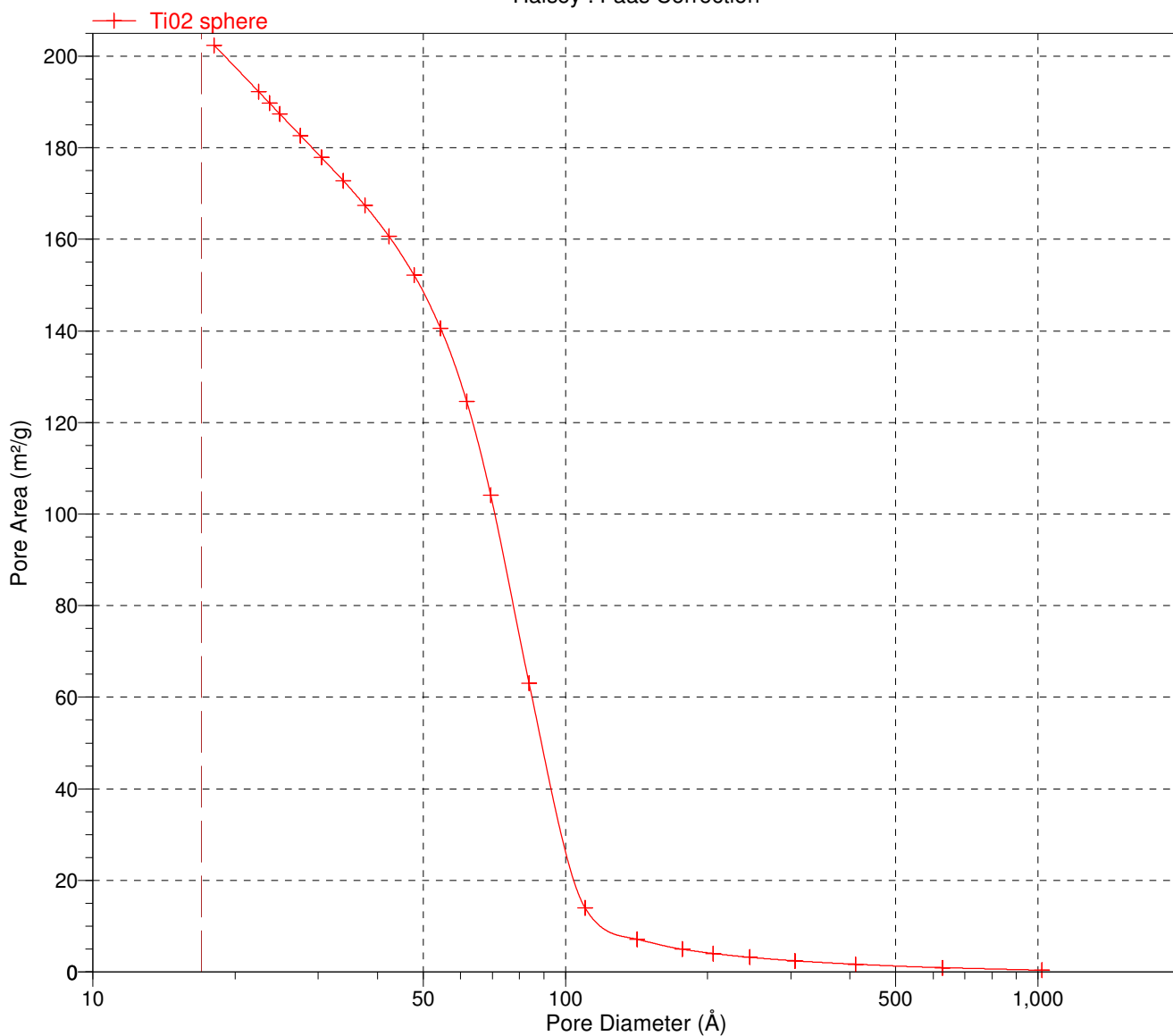
Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
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Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

BJH Desorption Cumulative Pore Area

Halsey : Faas Correction



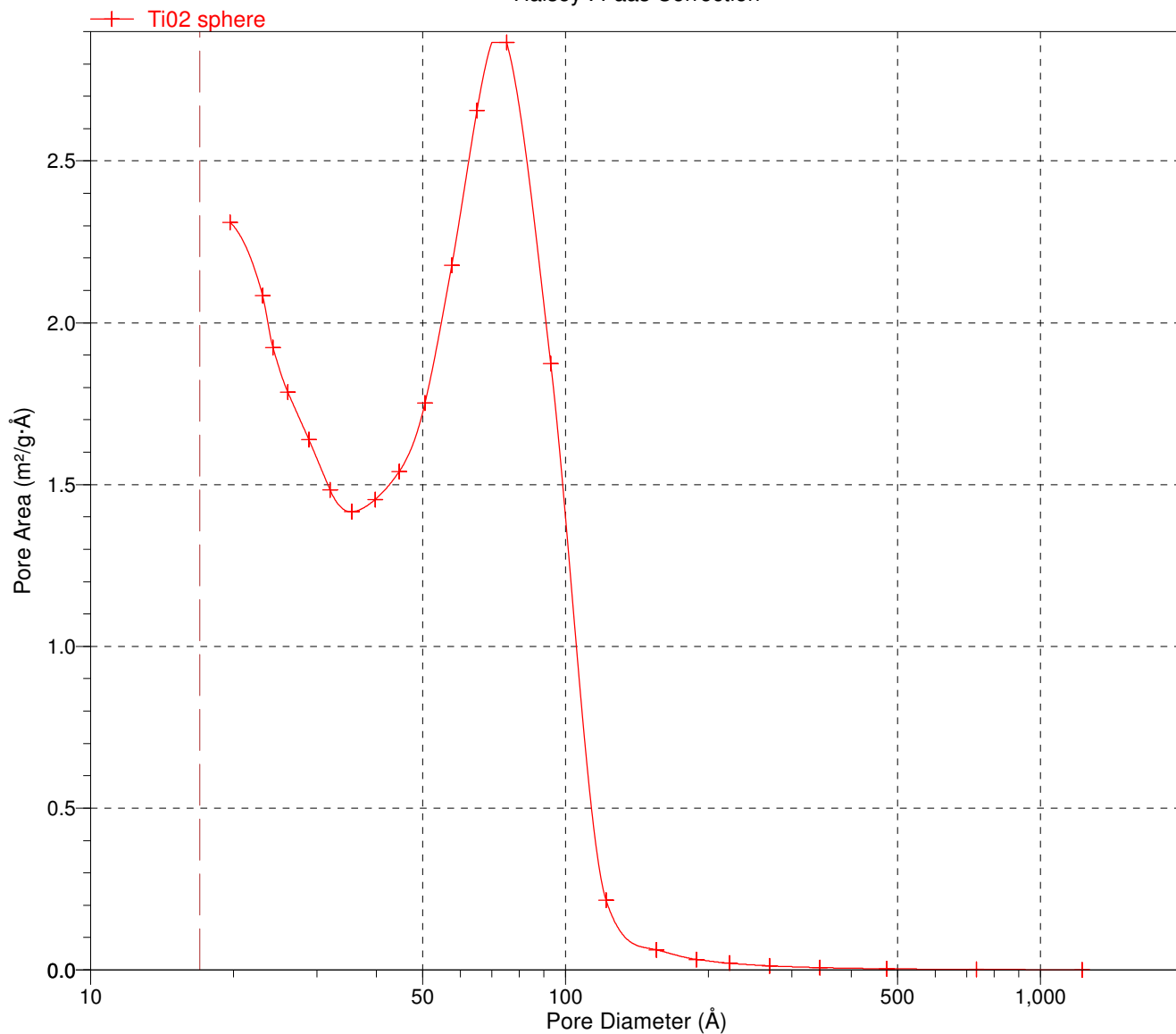
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BJH Desorption dA/dD Pore Area

Halsey : Faas Correction



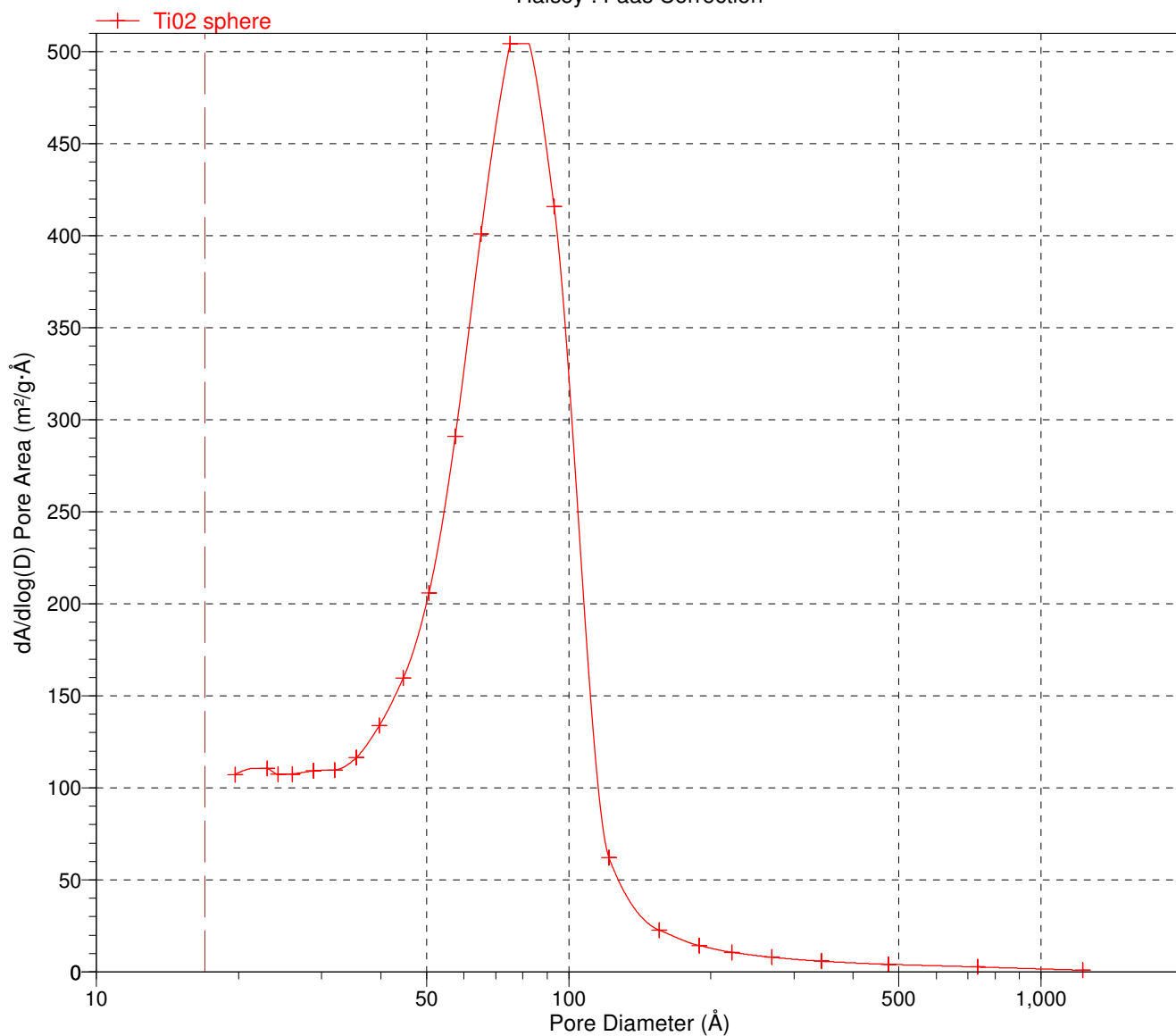
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BJH Desorption dA/dlog(D) Pore Area

Halsey : Faas Correction



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 Automatic Degas: Yes

Porosity Distribution by Original Density Functional Theory
 Model: N2 @ 77K on Carbon, Slit Pores
 Method: Non-negative Regularization; No Smoothing

Volume in Pores	<	11.79 Å	:	0.00359 cm ³ /g
Total Volume in Pores	<=	1720.79 Å	:	0.29880 cm ³ /g
Area in Pores	>	1720.79 Å	:	20.301 m ² /g
Total Area in Pores	>=	11.79 Å	:	92.736 m ² /g

Pore Size Table

Pore Width (Å)	Cumulative Volume (cm ³ /g)	Incremental Volume (cm ³ /g)	Cumulative Area (m ² /g)	Incremental Area (m ² /g)
11.79	0.00000	0.00000	0.000	0.000
12.69	0.00059	0.00059	0.938	0.938
13.58	0.00206	0.00146	3.090	2.153
14.83	0.00206	0.00000	3.090	0.000
15.91	0.00206	0.00000	3.090	0.000
17.16	0.00206	0.00000	3.090	0.000
18.59	0.00206	0.00000	3.090	0.000
20.02	0.00206	0.00000	3.090	0.000
21.62	0.00206	0.00000	3.090	0.000
23.41	0.00206	0.00000	3.090	0.000
25.20	0.00206	0.00000	3.090	0.000
27.34	0.00263	0.00057	3.510	0.420
29.49	0.00536	0.00273	5.361	1.851
31.81	0.00802	0.00266	7.032	1.671
34.31	0.01051	0.00250	8.488	1.456
36.99	0.01245	0.00194	9.534	1.046
40.03	0.01523	0.00278	10.924	1.390
43.25	0.01923	0.00400	12.774	1.850
46.64	0.02482	0.00559	15.170	2.396
50.40	0.03135	0.00653	17.762	2.592
54.33	0.03930	0.00795	20.688	2.926
58.80	0.04855	0.00925	23.835	3.148
63.44	0.05984	0.01129	27.394	3.559
68.45	0.07359	0.01375	31.411	4.017
73.99	0.08712	0.01353	35.068	3.657
79.88	0.10277	0.01566	38.988	3.920
86.32	0.12723	0.02445	44.655	5.666
93.11	0.15562	0.02839	50.752	6.098
100.61	0.18429	0.02868	56.453	5.701
108.66	0.21264	0.02835	61.670	5.218
117.23	0.23262	0.01998	65.080	3.409
126.53	0.24628	0.01366	67.239	2.159
136.71	0.25710	0.01081	68.820	1.581
147.61	0.26542	0.00833	69.949	1.128
159.41	0.27158	0.00616	70.722	0.773
172.10	0.27587	0.00429	71.220	0.498

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 Equilibration Interval: 10 s
 Automatic Degas: Yes

Pore Size Table

Pore Width (Å)	Cumulative Volume (cm ³ /g)	Incremental Volume (cm ³ /g)	Cumulative Area (m ² /g)	Incremental Area (m ² /g)
185.86	0.27856	0.00269	71.509	0.289
200.69	0.28009	0.00154	71.662	0.153
216.60	0.28122	0.00112	71.766	0.104
233.93	0.28240	0.00118	71.867	0.101
252.52	0.28353	0.00113	71.956	0.090
272.71	0.28450	0.00098	72.028	0.072
294.51	0.28515	0.00064	72.072	0.044
317.92	0.28570	0.00055	72.107	0.035
343.30	0.28645	0.00075	72.150	0.044
370.64	0.28723	0.00078	72.192	0.042
400.31	0.28796	0.00073	72.229	0.036
432.30	0.28853	0.00057	72.255	0.026
466.79	0.28907	0.00054	72.278	0.023
503.96	0.28964	0.00058	72.301	0.023
544.17	0.28988	0.00024	72.310	0.009
587.60	0.28990	0.00002	72.310	0.001
634.42	0.28999	0.00008	72.313	0.003
684.99	0.29044	0.00045	72.326	0.013
739.68	0.29110	0.00066	72.344	0.018
798.65	0.29205	0.00095	72.368	0.024
862.45	0.29328	0.00123	72.396	0.029
931.26	0.29415	0.00087	72.415	0.019
1005.60	0.29465	0.00050	72.425	0.010
1085.66	0.29498	0.00034	72.431	0.006
1172.33	0.29521	0.00022	72.435	0.004
1265.80	0.29521	0.00000	72.435	0.000
1366.77	0.29521	0.00000	72.435	0.000
1475.96	0.29521	0.00000	72.435	0.000
1593.55	0.29521	0.00000	72.435	0.000
1720.79	0.29521	0.00000	72.435	0.000

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 Equilibration Interval: 10 s
 Automatic Degas: Yes

Porosity Distribution by Original Density Functional Theory
 Model: N2 @ 77K on Carbon, Slit Pores
 Method: Non-negative Regularization; No Smoothing

Standard Deviation of Fit: 1.13347, cm³/g STP

Isotherm Table

Relative Pressure	Experimental Quantity Adsorbed (cm ³ /g STP)	Fitted Quantity Adsorbed (cm ³ /g STP)	Absolute Residual (cm ³ /g STP)	Relative Residual
0.002668156	19.2055	19.7244	-0.5190	-0.027022
0.003524104	20.0137	20.3391	-0.3253	-0.016256
0.004594232	20.7801	20.9061	-0.1260	-0.006063
0.005915212	21.5117	21.5144	-0.0027	-0.000125
0.007526182	22.2229	22.0429	0.1800	0.008100
0.009468212	22.9342	22.8887	0.0455	0.001984
0.011783670	23.5398	23.3868	0.1530	0.006501
0.014515520	24.1732	23.8708	0.3024	0.012511
0.017706521	24.8561	24.3564	0.4997	0.020105
0.021398440	25.5628	24.8557	0.7070	0.027659
0.025631230	26.2522	25.3805	0.8717	0.033204
0.030442240	26.9177	25.9431	0.9746	0.036207
0.035865448	27.6209	26.5577	1.0632	0.038491
0.041930798	28.3221	27.2402	1.0819	0.038201
0.048663601	29.0465	28.0084	1.0381	0.035739
0.056084011	29.8026	28.8805	0.9222	0.030943
0.064206667	30.5543	29.8704	0.6839	0.022382
0.073040441	31.3386	30.9791	0.3595	0.011471
0.082588248	32.1485	32.1833	-0.0348	-0.001083
0.092847057	32.9995	33.4346	-0.4351	-0.013185
0.103808001	33.8875	34.6759	-0.7884	-0.023265
0.115456402	34.7971	35.8647	-1.0676	-0.030680
0.127772301	35.7395	36.9815	-1.2421	-0.034754
0.140730694	36.7121	38.0249	-1.3128	-0.035760
0.154301897	37.7222	39.0027	-1.2805	-0.033945
0.168452203	38.7632	39.9266	-1.1634	-0.030012
0.183144197	39.8286	40.8089	-0.9803	-0.024612
0.198337302	40.9289	41.6613	-0.7324	-0.017894
0.213988706	42.0613	42.4950	-0.4337	-0.010312
0.230053306	43.2231	43.5073	-0.2841	-0.006574
0.246484801	44.4095	44.3327	0.0768	0.001729
0.263235897	45.6165	45.1694	0.4471	0.009802
0.280259013	46.8482	46.9362	-0.0879	-0.001877
0.297506303	48.1023	47.8141	0.2882	0.005992
0.314930797	49.3748	49.6474	-0.2726	-0.005520
0.332486212	50.6681	50.5991	0.0689	0.001360
0.350127310	51.9776	51.6019	0.3757	0.007229
0.367810607	53.3148	53.5334	-0.2186	-0.004100

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Isotherm Table

Relative Pressure	Experimental Quantity Adsorbed (cm ³ /g STP)	Fitted Quantity Adsorbed (cm ³ /g STP)	Absolute Residual (cm ³ /g STP)	Relative Residual
0.385494202	54.6743	54.6247	0.0495	0.000906
0.403138310	56.0615	55.7507	0.3108	0.005545
0.420704991	57.4810	57.5775	-0.0965	-0.001678
0.438158900	58.9236	58.7053	0.2183	0.003705
0.455466807	60.3947	60.8241	-0.4294	-0.007110
0.472598106	61.8940	61.8883	0.0057	0.000091
0.489524394	63.4527	62.9190	0.5337	0.008411
0.506219923	65.0792	65.4001	-0.3209	-0.004931
0.522661209	66.7648	66.3580	0.4068	0.006093
0.538827300	68.5256	69.4270	-0.9013	-0.013153
0.554699600	70.3476	70.3348	0.0128	0.000181
0.570261598	72.2131	71.2381	0.9750	0.013501
0.585499227	74.1731	74.6889	-0.5158	-0.006954
0.600400090	76.1637	75.5854	0.5783	0.007593
0.614954293	78.3110	79.6773	-1.3664	-0.017448
0.629153311	80.5999	80.5899	0.0101	0.000125
0.642990828	82.9599	81.5304	1.4295	0.017231
0.656461716	85.4491	86.2680	-0.8188	-0.009583
0.669562697	88.1018	87.2352	0.8665	0.009836
0.682291925	90.8835	92.9222	-2.0387	-0.022432
0.694648683	93.8391	93.8834	-0.0443	-0.000472
0.706633508	96.9927	94.8436	2.1491	0.022158
0.718248010	100.3149	101.5916	-1.2768	-0.012728
0.729494929	103.7909	102.4780	1.3129	0.012649
0.740377605	107.5572	109.1809	-1.6237	-0.015096
0.750900388	111.6438	109.9881	1.6557	0.014830
0.761068285	115.8674	117.6835	-1.8161	-0.015674
0.770887017	120.2668	118.4226	1.8442	0.015334
0.780362606	125.3035	130.1711	-4.8676	-0.038847
0.789501607	130.7872	130.8454	-0.0581	-0.000445
0.798311174	136.5093	131.5231	4.9862	0.036527
0.806798697	142.2963	145.1847	-2.8884	-0.020298
0.814971626	148.7265	145.8167	2.9098	0.019564
0.822837889	156.2333	159.8209	-3.5876	-0.022963
0.830405474	164.0230	160.4138	3.6093	0.022005
0.837682605	171.4507	174.4491	-2.9984	-0.017488
0.844677329	178.0090	174.9944	3.0146	0.016935
0.851397991	183.3098	185.1579	-1.8481	-0.010082
0.857852995	187.5118	185.6548	1.8570	0.009903
0.864050388	191.3207	192.8180	-1.4973	-0.007826
0.869998574	194.7703	193.2672	1.5030	0.007717
0.875705481	197.8799	199.0683	-1.1884	-0.006006
0.881179392	200.6694	199.4775	1.1919	0.005940
0.886428118	203.1585	204.0699	-0.9114	-0.004486

Sample: TiO2 sphere
 Operator: Ariharan
 Submitter: Prof.krk
 File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
 Completed: 9/8/2013 11:24:47AM
 Report Time: 9/10/2013 3:55:57PM
 Sample Mass: 0.1500 g
 Cold Free Space: 71.4897 cm³
 Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
 Analysis Bath Temp.: -195.545 °C
 Thermal Correction: No
 Warm Free Space: 22.3488 cm³ Measured
 Equilibration Interval: 10 s
 Automatic Degas: Yes

Isotherm Table

Relative Pressure	Experimental Quantity Adsorbed (cm ³ /g STP)	Fitted Quantity Adsorbed (cm ³ /g STP)	Absolute Residual (cm ³ /g STP)	Relative Residual
0.891459525	205.3669	204.4534	0.9134	0.004448
0.896281302	207.3139	207.9788	-0.6649	-0.003207
0.900900900	209.0183	208.3524	0.6659	0.003186
0.905325770	210.4984	210.9460	-0.4476	-0.002126
0.909563184	211.7717	211.3238	0.4479	0.002115
0.913620114	212.8550	213.1158	-0.2608	-0.001225
0.917503417	213.7656	213.5050	0.2606	0.001219
0.921219707	214.5525	214.7134	-0.1610	-0.000750
0.924775481	215.2687	215.1082	0.1605	0.000746
0.928177178	215.9524	216.1011	-0.1486	-0.000688
0.931430817	216.6331	216.4850	0.1482	0.000684
0.934542298	217.3331	217.4996	-0.1665	-0.000766
0.937517405	218.0307	217.8647	0.1661	0.000762
0.940361619	218.6958	218.8395	-0.1438	-0.000657
0.943080306	219.3353	219.1920	0.1433	0.000653
0.945678592	219.9549	220.0806	-0.1256	-0.000571
0.948161721	220.5590	220.4339	0.1252	0.000567
0.950534225	221.1509	221.1515	-0.0006	-0.000003
0.952800930	221.7330	221.8308	-0.0978	-0.000441
0.954966187	222.3086	222.2112	0.0974	0.000438
0.957034409	222.9142	223.0285	-0.1143	-0.000513
0.959009588	223.5429	223.4290	0.1139	0.000510
0.960896015	224.1703	224.2745	-0.1043	-0.000465
0.962697208	224.7774	224.6735	0.1039	0.000462
0.964416981	225.3718	225.4807	-0.1089	-0.000483
0.966058910	225.9705	225.8619	0.1086	0.000480
0.967626274	226.5648	226.5653	-0.0004	-0.000002
0.969122529	227.1483	227.2466	-0.0983	-0.000433
0.970550597	227.7157	227.6176	0.0980	0.000431
0.971913695	228.2631	228.3313	-0.0681	-0.000299
0.973214507	228.7878	228.7200	0.0678	0.000296
0.974455774	229.2735	229.2837	-0.0101	-0.000044
0.975640416	229.7164	229.7067	0.0098	0.000043
0.976770699	230.1534	230.1538	-0.0003	-0.000001
0.977849126	230.6132	230.6459	-0.0327	-0.000142
0.978878021	231.1165	231.0840	0.0324	0.000140
0.979859591	231.6778	231.7829	-0.1051	-0.000453
0.980795979	232.3067	232.2019	0.1049	0.000451
0.981689274	233.0085	233.0088	-0.0003	-0.000001
0.982541502	233.7853	233.9936	-0.2083	-0.000891
0.983354270	234.6233	234.4151	0.2082	0.000887
0.984129488	235.4374	235.5963	-0.1589	-0.000675
0.984869003	236.2140	236.0552	0.1588	0.000672
0.985574186	236.9545	237.0603	-0.1058	-0.000446

Sample: TiO2 sphere
 Operator: Ariharan
 Submitter: Prof.krk
 File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
 Completed: 9/8/2013 11:24:47AM
 Report Time: 9/10/2013 3:55:57PM
 Sample Mass: 0.1500 g
 Cold Free Space: 71.4897 cm³
 Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
 Analysis Bath Temp.: -195.545 °C
 Thermal Correction: No
 Warm Free Space: 22.3488 cm³ Measured
 Equilibration Interval: 10 s
 Automatic Degas: Yes

Isotherm Table

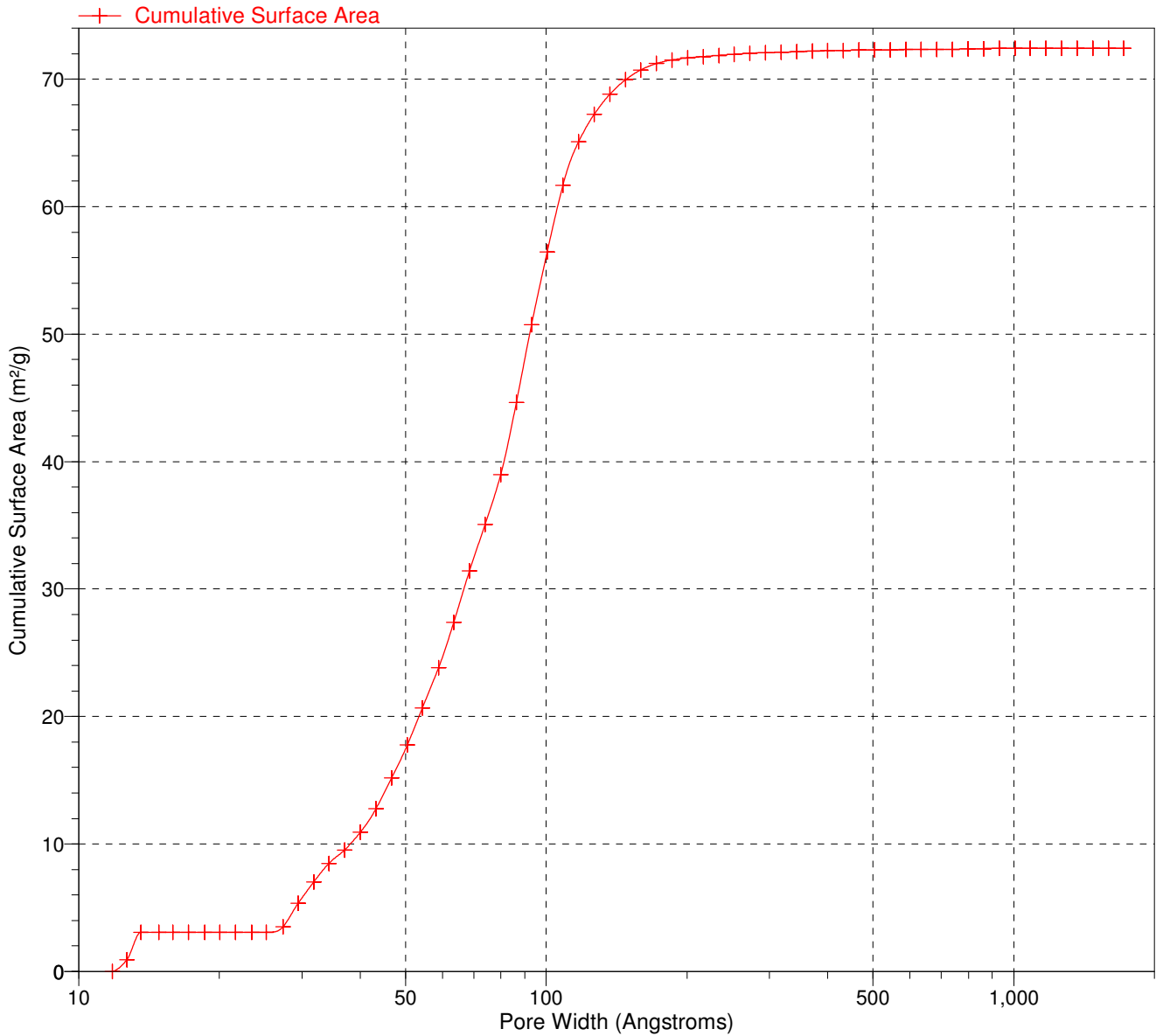
Relative Pressure	Experimental Quantity Adsorbed (cm ³ /g STP)	Fitted Quantity Adsorbed (cm ³ /g STP)	Absolute Residual (cm ³ /g STP)	Relative Residual
0.986246824	237.6609	237.5552	0.1056	0.000444
0.986888289	238.3345	238.3347	-0.0002	-0.000001
0.987500012	238.9769	239.0461	-0.0692	-0.000290
0.988083303	239.5894	239.5203	0.0691	0.000288
0.988639593	240.1735	240.1260	0.0475	0.000198
0.989170074	240.7306	240.5968	0.1338	0.000556
0.989675879	241.2618	241.0897	0.1721	0.000713
0.990158200	241.7683	241.6021	0.1661	0.000687
0.990618110	242.2512	242.1432	0.1080	0.000446
0.991056621	242.7117	242.7034	0.0083	0.000034
0.991474688	243.1507	243.2693	-0.1186	-0.000488
0.991873324	243.5693	243.7564	-0.1870	-0.000768
0.992253423	243.9685	244.3010	-0.3325	-0.001363

Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
Completed: 9/8/2013 11:24:47AM
Report Time: 9/10/2013 3:55:57PM
Sample Mass: 0.1500 g
Cold Free Space: 71.4897 cm³
Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Cumulative Surface Area vs. Pore Width

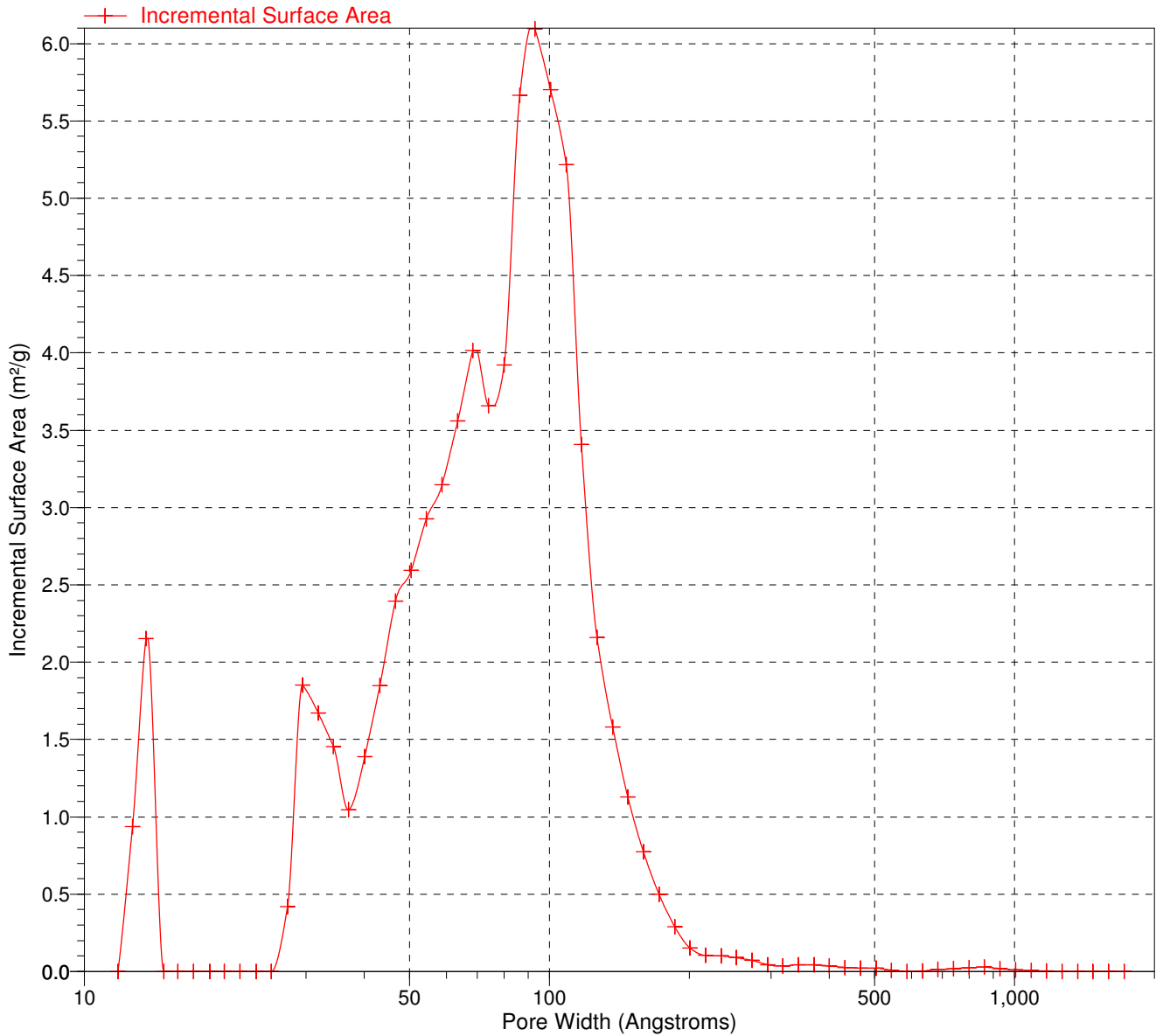


Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

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Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Incremental Surface Area vs. Pore Width

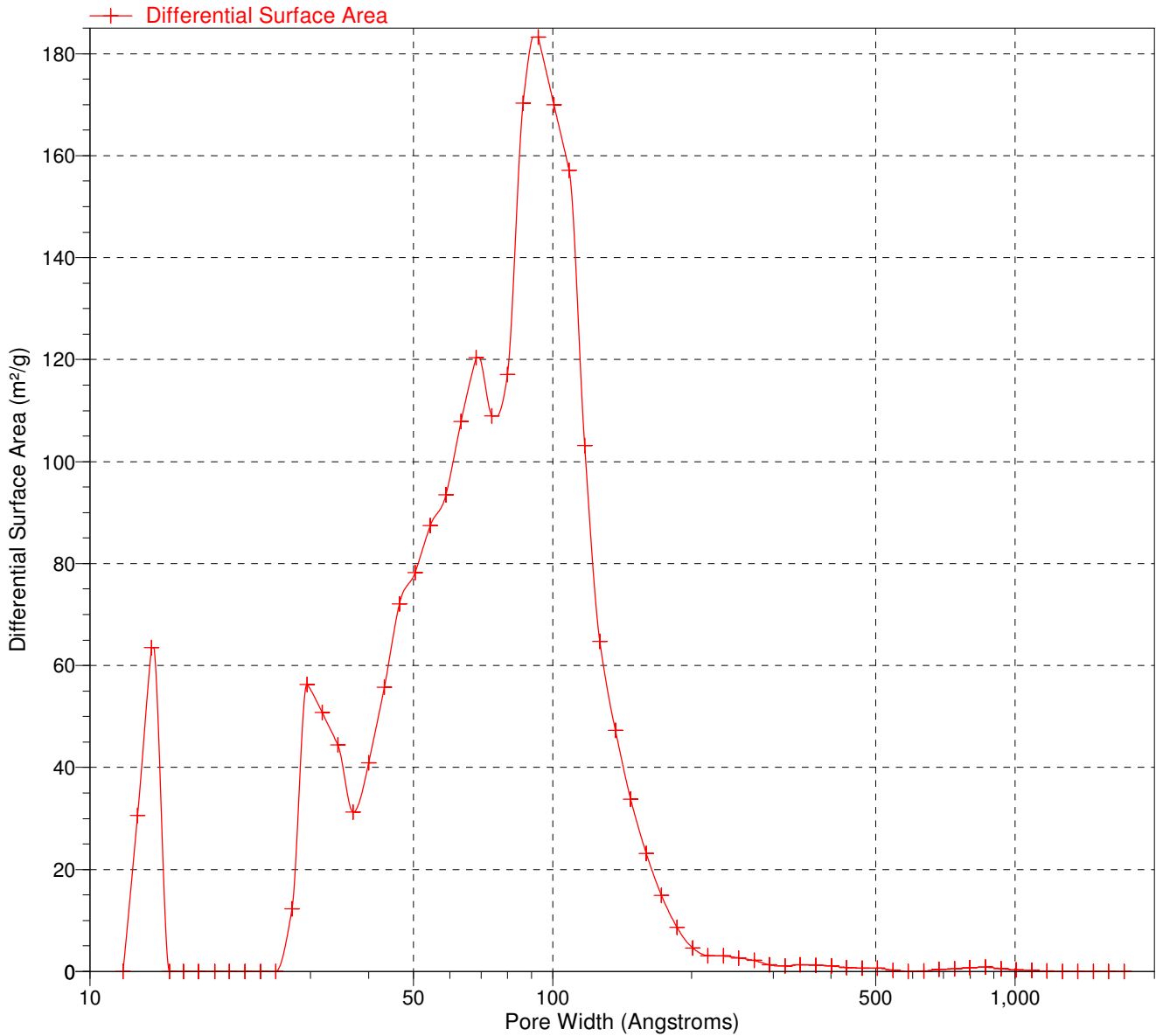


Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
Completed: 9/8/2013 11:24:47AM
Report Time: 9/10/2013 3:55:57PM
Sample Mass: 0.1500 g
Cold Free Space: 71.4897 cm³
Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Differential Surface Area vs. Pore Width

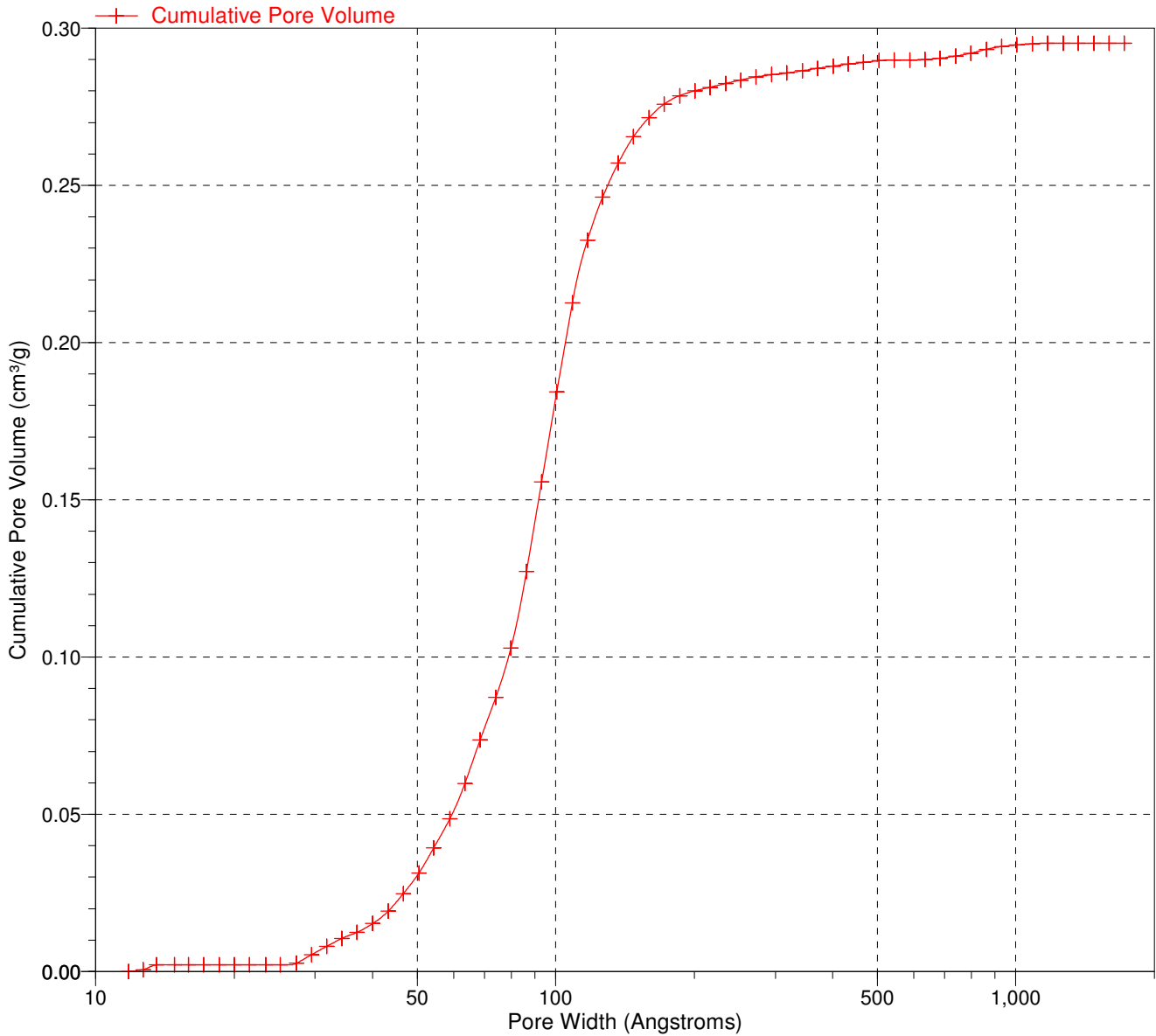


Sample: TiO₂ sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
Completed: 9/8/2013 11:24:47AM
Report Time: 9/10/2013 3:55:57PM
Sample Mass: 0.1500 g
Cold Free Space: 71.4897 cm³
Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N₂
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Cumulative Pore Volume vs. Pore Width

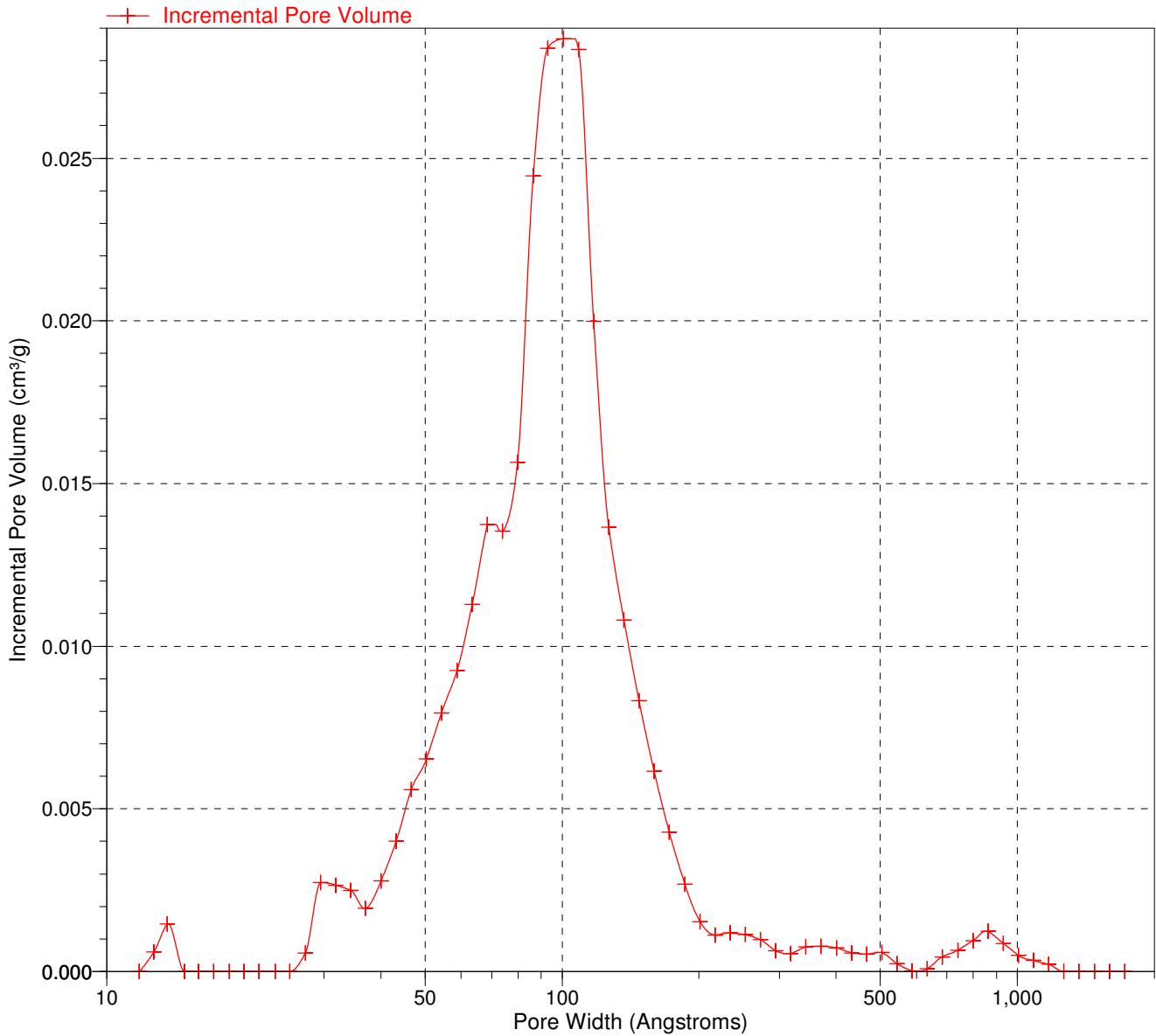


Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
Completed: 9/8/2013 11:24:47AM
Report Time: 9/10/2013 3:55:57PM
Sample Mass: 0.1500 g
Cold Free Space: 71.4897 cm³
Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Incremental Pore Volume vs. Pore Width

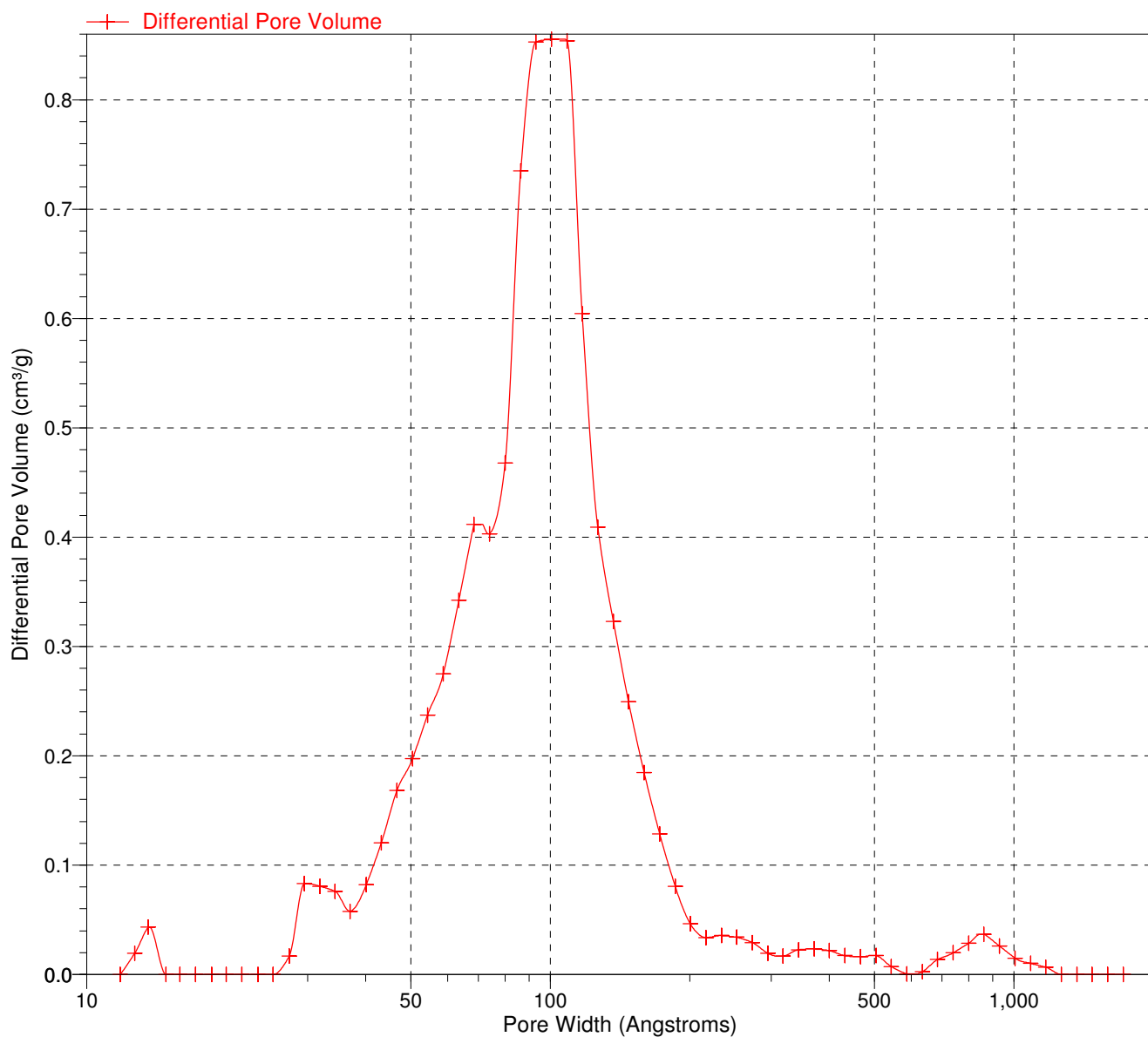


Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

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Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Differential Pore Volume vs. Pore Width

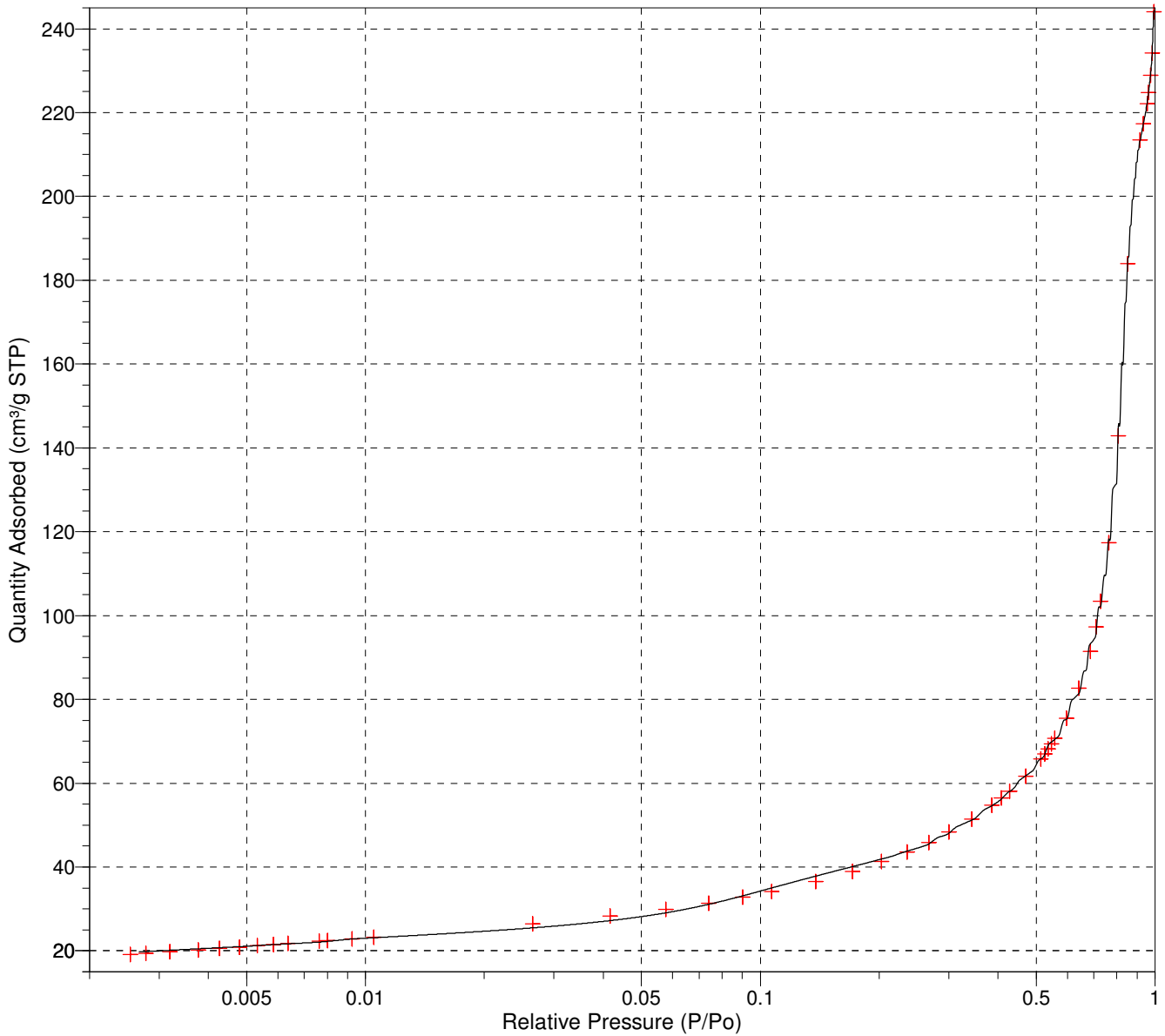


Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krak
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
Completed: 9/8/2013 11:24:47AM
Report Time: 9/10/2013 3:55:57PM
Sample Mass: 0.1500 g
Cold Free Space: 71.4897 cm³
Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Goodness of Fit

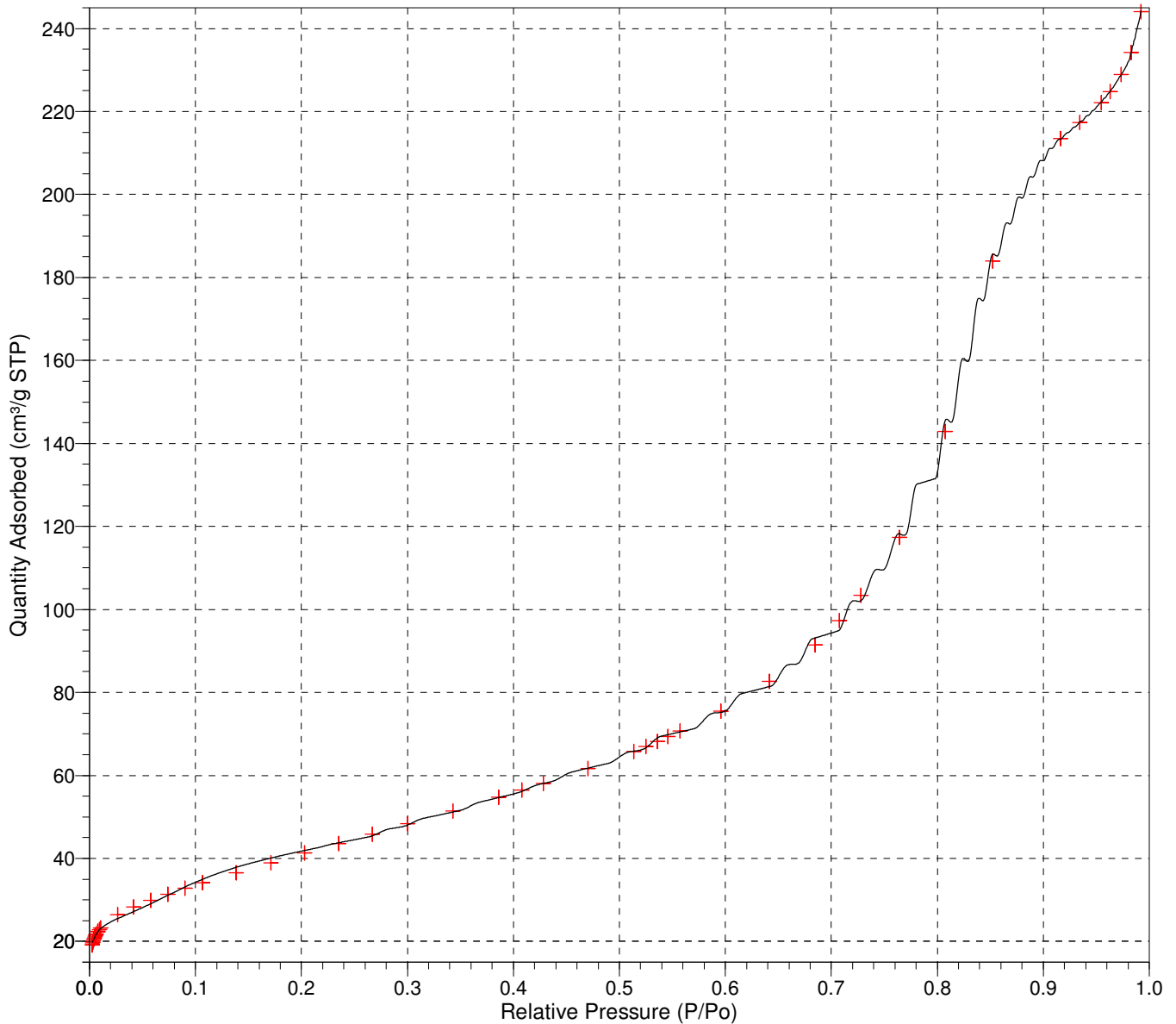


Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krk
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
Completed: 9/8/2013 11:24:47AM
Report Time: 9/10/2013 3:55:57PM
Sample Mass: 0.1500 g
Cold Free Space: 71.4897 cm³
Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Goodness of Fit



Sample: TiO2 sphere
 Operator: Ariharan
 Submitter: Prof.krak
 File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
 Completed: 9/8/2013 11:24:47AM
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 Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
 Analysis Bath Temp.: -195.545 °C
 Thermal Correction: No
 Warm Free Space: 22.3488 cm³ Measured
 Equilibration Interval: 10 s
 Automatic Degas: Yes

Dubinin-Astakhov Tabular Report

Slope: -0.139193 ± 0.000651
 Y-Intercept: 1.642375 ± 0.001434
 Correlation Coefficient: 0.999858
 Fitted Relative Pressure Range: 0.000100000 to 0.050000000

Characteristic Energy: 14.047274 kJ/mol
 Limiting Micropore Capacity: 43.891001 cm³/g STP
 Limiting Micropore Volume: 0.067891 ± 0.000225 cm³/g
 Equivalent Surface Area: 140.809008 m²/g

Affinity Coefficient (beta): 0.33000
 Optimize Exponent: Yes
 Exponent: 1.0000

Density Conversion Factor: 0.0015468
 Molecular Cross-Sectional Area: 0.162 nm²

Medek Quantities

Mean Equivalent Pore Width: 19.285869 Å
 Maximum Differential Pore Volume: 0.004575 cm³/g·Å
 Modal Equivalent Pore Width: 15.647120 Å

Absolute Pressure (mmHg)	Relative Pressure (P/Po)	Quantity Adsorbed (cm ³ /g STP)	Log Quantity Adsorbed	Log (Po/P)^1.0000	Differential Pore Volume (cm ³ /g·Å)
1.982602	0.002536002	19.0558	1.2800	2.59585	0.004033
2.174092	0.002780767	19.3259	1.2861	2.555835	0.003998
2.499239	0.003196412	19.7310	1.2951	2.495337	0.003945
2.948616	0.003770907	20.2096	1.3056	2.423554	0.003880
3.339288	0.004270214	20.5691	1.3132	2.36955	0.003830
3.752836	0.004798800	20.9059	1.3203	2.318867	0.003782
4.162819	0.005322715	21.2053	1.3264	2.273867	0.003738
4.572170	0.005845819	21.4772	1.3320	2.233155	0.003698
4.981505	0.006368847	21.7277	1.3370	2.195939	0.003660
5.969562	0.007631677	22.2625	1.3476	2.11738	0.003579
6.261948	0.008005221	22.4000	1.3502	2.096627	0.003557
7.221776	0.009231774	22.8511	1.3589	2.034715	0.003486
8.213517	0.010498991	23.2275	1.3660	1.978852	0.003426
20.761000	0.026536240	26.3817	1.4213	1.576161	0.002889
32.534840	0.041583555	28.2848	1.4516	1.381078	0.002546
45.032848	0.057555148	29.9415	1.4763	1.239916	0.002240
57.835327	0.073913018	31.4132	1.4971	1.131279	0.001965
70.520134	0.090121294	32.7756	1.5156	1.045173	0.001711
83.617279	0.106854396	34.1280	1.5331	0.9712076	0.001461
108.275757	0.138361143	36.5354	1.5627	0.8589859	0.001026
133.781570	0.170946918	38.9445	1.5904	0.7671387	0.000618
158.796631	0.202902941	41.2593	1.6155	0.6927117	0.000272
184.009476	0.235109036	43.5887	1.6394	0.6287307	0.000015

Sample: TiO2 sphere
 Operator: Ariharan
 Submitter: Prof.krak
 File: C:\2020\DATA\001-409.SMP

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 Sample Mass: 0.1500 g
 Cold Free Space: 71.4897 cm³
 Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
 Analysis Bath Temp.: -195.545 °C
 Thermal Correction: No
 Warm Free Space: 22.3488 cm³ Measured
 Equilibration Interval: 10 s
 Automatic Degas: Yes

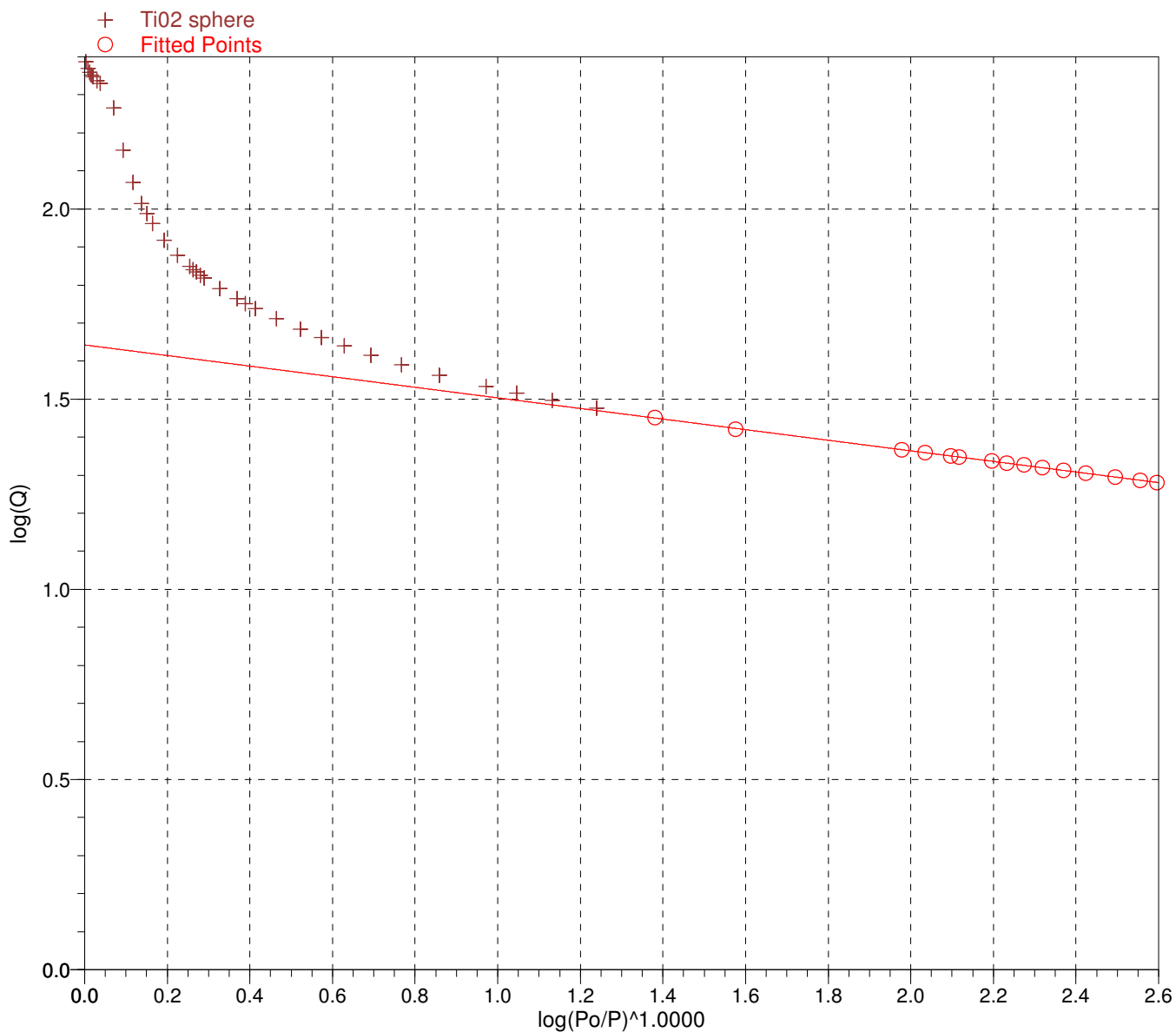
Absolute Pressure (mmHg)	Relative Pressure (P/Po)	Quantity Adsorbed (cm ³ /g STP)	Log Quantity Adsorbed	Log (Po/P) ^{1.0000}	Differential Pore Volume (cm ³ /g·Å)
209.085373	0.267140257	45.8982	1.6618	0.5732607	0.000000
235.079544	0.300339603	48.3085	1.6840	0.5223874	0.000000
268.399841	0.342895743	51.4388	1.7113	0.4648379	0.000000
302.331604	0.386229519	54.7312	1.7382	0.4131545	0.000000
319.245728	0.407820531	56.4356	1.7516	0.3895309	0.000000
335.305847	0.428323277	58.1071	1.7642	0.3682283	0.000000
368.280487	0.470426022	61.7011	1.7903	0.3275087	0.000000
401.988312	0.513456496	65.8090	1.8183	0.2894963	0.000000
411.085602	0.525060144	67.0199	1.8262	0.2797909	0.000000
419.600647	0.535919422	68.1968	1.8338	0.2709005	0.000000
427.388763	0.545849615	69.3280	1.8409	0.262927	0.000000
436.501038	0.557470319	70.6686	1.8492	0.2537783	0.000000
466.424377	0.595655715	75.5179	1.8780	0.2250047	0.000000
502.211029	0.641318020	82.6685	1.9173	0.1929266	0.000000
536.333008	0.684841975	91.4637	1.9612	0.1644096	0.000000
554.208069	0.707622801	97.2601	1.9879	0.1501982	0.000000
570.306213	0.728132150	103.3602	2.0144	0.1377898	0.000000
598.876282	0.764537718	117.3460	2.0695	0.1166011	0.000000
632.698669	0.807616148	142.8633	2.1549	0.09279501	0.000000
667.911804	0.852440802	184.0158	2.2649	0.06933577	0.000000
718.103638	0.916409014	213.5208	2.3294	0.03791065	0.000000
732.383240	0.934590003	217.3444	2.3371	0.02937887	0.000000
748.022644	0.954504518	222.1830	2.3467	0.02022201	0.000000
754.553040	0.962811618	224.8159	2.3518	0.01645868	0.000000
762.917358	0.9734449562	228.8826	2.3596	0.01168655	0.000000
770.412048	0.982968352	234.2181	2.3696	0.007460465	0.000000
777.810730	0.992354890	244.0750	2.3875	0.003332986	0.000000

Sample: TiO2 sphere
 Operator: Ariharan
 Submitter: Prof.krk
 File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
 Completed: 9/8/2013 11:24:47AM
 Report Time: 9/10/2013 3:55:57PM
 Sample Mass: 0.1500 g
 Cold Free Space: 71.4897 cm³
 Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
 Analysis Bath Temp.: -195.545 °C
 Thermal Correction: No
 Warm Free Space: 22.3488 cm³ Measured
 Equilibration Interval: 10 s
 Automatic Degas: Yes

Dubinin-Astakhov Transformed Isotherm Plot



Sample: TiO2 sphere
Operator: Ariharan
Submitter: Prof.krak
File: C:\2020\DATA\001-409.SMP

Started: 9/8/2013 1:24:52AM
Completed: 9/8/2013 11:24:47AM
Report Time: 9/10/2013 3:55:57PM
Sample Mass: 0.1500 g
Cold Free Space: 71.4897 cm³
Low Pressure Dose: 10.000 cm³/g STP

Analysis Adsorptive: N2
Analysis Bath Temp.: -195.545 °C
Thermal Correction: No
Warm Free Space: 22.3488 cm³ Measured
Equilibration Interval: 10 s
Automatic Degas: Yes

Dubinin-Astakhov Differential Pore Volume Plot (Exponent = 1.0000)

