

LAMPIRAN

A. Data Hasil Pengukuran Diameter Serat Nano PVA/TiO₂

A.1. Data ImageJ Sampel PVA/TiO₂ 0,4% Tanpa Modifikasi Plasma :

Tabel 1. Data hasil pengukuran ukuran serat nano tanpa modifikasi plasma

S 0,3%	Area	Mean	Min	Max	Angle	Length
1	0.009	229,983	210,041	250,172	-122,471	0.326
2	0.007	189,012	91,000	244,000	-45,000	0.283
3	0.007	184,924	167,545	203,000	15,255	0.285
4	0.005	167,893	120,000	202,000	-26,565	0.168
5	0.004	198,433	174,800	225,000	-21,801	0.135
6	0.005	162,564	111,000	197,000	-63,435	0.238
7	0.004	152,321	140,333	163,667	30,964	0.146
8	0.004	164,762	108,000	188,000	18,435	0.158
9	0.007	165,768	129,859	195,901	-33,690	0.270
10	0.004	105,321	60,000	153,000	-59,036	0.346
11	0.006	88,819	61,125	109,750	-97,125	0.202
12	0.005	111,194	83,000	126,367	-63,435	0.368
13	0.006	161,531	136,000	180,000	-129,806	0.195
14	0.004	163,143	128,000	197,000	-18,435	0.358
15	0.004	171,857	129,000	193,000	-71,565	0.458
16	0.004	130,700	112,000	148,680	-53,130	0.125
17	0.004	135,774	118,000	149,333	-149,036	0.446
18	0.005	204,740	161,000	237,020	-146,310	0.180
19	0.004	160,286	139,000	183,000	0.000	0.350
20	0.007	199,862	173,000	231,000	-66,038	0.246
21	0.012	144,193	124,556	159,741	-51,843	0.445
22	0.011	178,697	162,000	195,062	-32,735	0.416
23	0.008	200,444	179,653	215,950	-135,000	0.283
24	0.008	142,917	129,868	151,215	37,875	0.245
25	0.009	177,195	148,000	191,953	-122,471	0.326
26	0.014	148,334	117,333	175,898	-25,346	0.443
27	0.014	190,449	151,000	225,943	-39,094	0.455
28	0.011	161,850	54,000	201,000	-76,759	0.437
29	0.012	168,167	126,000	193,111	29,358	0.359
30	0.006	114,694	39,000	137,198	-63,435	0.224

A.2. Data ImageJ Sampel Serat Nano PVA/TiO₂ 0,3% Modifikasi Plasma

Tabel 2. Data hasil pengukuran ukuran serat nano PVA/TiO₂ 0,3%

S 0,4%	Area	Mean	Min	Max	Angle	Length
1	0.007	89,382	75	109,400	-11,310	0.359
2	0.014	115,851	107,964	128,676	-22,834	0.423
3	0.006	153,547	135,000	175,395	-144,462	0.218
4	0.004	132,033	123,000	139,000	-53,130	0.137
5	0.006	119,090	105,000	134,000	-153,435	0.227
6	0.006	84,896	59,000	96,000	-39,806	0.198
7	0.008	119,263	110,000	137,167	-120,964	0.296
8	0.007	111,036	90,000	142,000	11,310	0.459
9	0.007	108,364	96,000	135,000	0.000	0.374
10	0.009	114,385	93,000	140,657	-108,435	0.321
11	0.005	95,714	90,000	102,429	-81,870	0.149
12	0.009	77,492	61,000	88,391	-138,013	0.441
13	0.006	140,304	128,000	154,852	-139,399	0.434
14	0.012	113,153	98,775	125,114	30,964	0.444
15	0.008	109,058	94,000	120,917	26,565	0.454
16	0.005	106,286	99,000	122,286	8,130	0.449
17	0.005	99,719	95,449	106,490	56,310	0.183
18	0.005	82,663	63,000	95,816	-123,690	0.483
19	0.005	99,000	90,000	107,000	0.000	0.148
20	0.006	94,433	79,667	126,000	6,340	0.230
21	0.007	98,372	89,314	117	-138,814	0.468
22	0.007	120,333	107,000	138	0.000	0.375
23	0.009	101,198	82,462	131	8,746	0.329
24	0.008	125,500	106,000	151,250	-149,036	0.292
25	0.004	100,190	82,000	112,389	-51,340	0.160
26	0.006	126,841	114,556	137,333	-69,444	0.314
27	0.006	94,007	81,000	102,963	-130,601	0.230
28	0.007	95,673	75,000	118,000	-11,310	0.255
29	0.006	99,922	87,111	108,778	6,340	0.226
30	0.007	88,649	80,000	94,711	-153,435	0.280

A.3. Data ImageJ Sampel Serat Nano PVA/TiO₂ 0,4% Modifikasi Plasma

Tabel 3. Data hasil pengukuran ukuran serat nano PVA/TiO₂ 0,4%

S0,5%	Area	Mean	Min	Max	Angle	Length
1	0.010	136,435	126,031	154	28,301	0.375
2	0.010	131,168	117,612	142	-72,897	0.445
3	0.007	124,676	114,500	133	-156,038	0.250
4	0.006	123,800	86,000	142	-49,399	0.234
5	0.006	120,363	114,469	127,086	-26,565	0.143
6	0.007	129,764	115,000	148,880	-143,130	0.254
7	0.005	129,429	102,000	147,163	-26,565	0.470
8	0.005	130,262	103,000	141,167	9,462	0.154
9	0.006	86,367	47,000	111,000	-12,529	0.234
10	0.008	159,235	141,000	175,636	10,305	0.284
11	0.009	131,512	116,331	141,000	22,620	0.230
12	0.005	117,418	108,429	126,000	-33,690	0.183
13	0.010	99,933	88,000	114,000	0.000	0.355
14	0.008	145,814	125,091	170,975	48,814	0.150
15	0.012	148,079	116,879	187,000	30,964	0.444
16	0.005	144,500	100,000	170,388	-33,690	0.498
17	0.009	133,374	122,781	147,000	18,435	0.321
18	0.012	163,469	144,536	177,000	28,072	0.431
19	0.012	155,618	133,519	218,000	-128,157	0.452
20	0.012	143,093	115,000	169,298	-28,072	0.431
21	0.011	109,850	94,500	135,000	-63,435	0.397
22	0.008	134,462	64,000	186,000	-90,000	0.365
23	0.007	102,855	91,000	108,800	-11,310	0.141
24	0.009	121,407	105,000	142,538	8,746	0.334
25	0.009	132,566	117,722	148,509	28,610	0.378
26	0.005	139,717	134,388	146,388	-26,565	0.170
27	0.009	133,549	120,308	145,077	4,399	0.331
28	0.007	159,633	142,800	192,000	-126,870	0.254
29	0.007	127,582	102,000	139,600	-73,301	0.145
30	0.007	159,018	137,600	189,000	-5,711	0.255

A.4. Data ImageJ Sampel Serat Nano PVA/TiO₂ 0,5% Modifikasi Plasma

Tabel 4. Data hasil pengukuran ukuran serat nano PVA/TiO₂ 0,5%

TP	Area	Mean	Min	Max	Angle	Length
1	0.033	173,026	113,896	225,060	30,466	0.416
2	0.027	155,093	97,128	167,675	-28,301	0.286
3	0.027	123,724	93,340	143,233	53,130	0.393
4	0.020	237,649	185,610	254,644	-41,634	0.315
5	0.020	166,810	128,045	194,041	-68,199	0.282
6	0.020	110,306	85,825	124,023	4,764	0.215
7	0.017	140,775	84,329	168,912	-147,995	0.467
8	0.023	184,262	118,434	211,140	-161,565	0.431
9	0.017	71,238	56,897	79,075	-7,125	0.211
10	0.020	75,338	63,892	82,663	-37,875	0.478
11	0.017	152,235	122,843	165,999	-159,444	0.124
12	0.033	108,940	102,990	115,133	0,000	0.477
13	0.023	174,519	108,169	204,923	9,462	0.318
14	0.023	169,609	134,365	184,659	-26,565	0.351
15	0.020	133,593	37,935	197,234	-143,130	0.462
16	0.023	112,359	90,391	122,012	4,399	0.341
17	0.010	140,944	133,424	149,587	-158,199	0.141
18	0.013	136,695	112,549	151,616	-51,340	0.148
19	0.020	244,274	235,462	252,785	-135,000	0.296
20	0.013	46,300	28,891	55,992	-15,945	0.191
21	0.020	155,169	137,602	165,232	33,690	0.283
22	0.013	190,199	167,509	206,088	-123,690	0.389
23	0.020	107,743	101,737	111,766	41,634	0.415
24	0.017	127,200	96,395	139,741	12,529	0.241
25	0.013	140,961	128,620	149,340	-38,660	0.168
26	0.017	88,620	50,782	103,806	-140,194	0.204
27	0.017	147,608	121,437	164,013	-104,036	0.216
28	0.013	129,026	91,935	147,269	-45,000	0.185
29	0.020	201,040	137,732	239,037	-30,964	0.365
30	0.023	22,201	11,218	29,983	12,995	0.359

A.5. Data ImageJ Sampel Serat Nano PVA/TiO₂ 0,4% Modifikasi Plasma

Tabel 5. Data hasil pengukuran serat nano PVA/TiO₂ 0,4% modifikasi plasma

1	0.004	152,321	140,333	163,667	30,964	0.146
2	0.004	164,762	108,000	188,000	18,435	0.158
3	0.005	167,893	120,000	202,000	-26,565	0.168
4	0.005	204,740	161,000	237,020	-146,310	0.180
5	0.006	161,531	136,000	180,000	-129,806	0.195
6	0.006	88,819	61,125	109,750	-97,125	0.112
7	0.006	114,694	39,000	137,198	-63,435	0.224
8	0.005	162,564	111,000	197,000	-63,435	0.238
9	0.008	142,917	129,868	151,215	37,875	0.245
10	0.007	199,862	173,000	231,000	-66,038	0.246
11	0.007	165,768	129,859	195,901	-33,690	0.270
12	0.004	100,190	82,000	112,389	-51,340	0.160
13	0.023	169,609	134,365	184,659	-26,565	0.351
14	0.023	22,201	11,218	29,983	12,995	0.359
15	0.006	123,800	86,000	142	-49,399	0.234
16	0.006	86,367	47,000	111,000	-12,529	0.234
17	0.007	124,676	114,500	133	-156,038	0.250
18	0.007	129,764	115,000	148,880	-143,130	0.254
19	0.007	159,633	142,800	192,000	-126,870	0.254
20	0.007	159,018	137,600	189,000	-5,711	0.255
21	0.008	159,235	141,000	175,636	10,305	0.284
22	0.009	133,374	122,781	147,000	18,435	0.321
23	0.009	133,549	120,308	145,077	4,399	0.331
24	0.009	121,407	105,000	142,538	8,746	0.334
25	0.010	99,933	88,000	114,000	0.000	0.355
26	0.008	134,462	64,000	186,000	-90,000	0.365
27	0.020	107,743	101,737	111,766	41,634	0.415
28	0.033	173,026	113,896	225,060	30,466	0.416
29	0.023	184,262	118,434	211,140	-161,565	0.431
30	0.020	133,593	37,935	197,234	-143,130	0.472

B. Data Distribusi Ukuran Serat Nano

Tabel 6. Data distribusi ukuran serat nano PVA/TiO₂ 0,3%

Length	Frequency			
	PVA/TiO ₂ 0,3%	PVA/TiO ₂ 0,4%	PVA/TiO ₂ 0,5%	PVA/TiO ₂ TP
100-150	3	3	4	3
151-200	4	3	3	3
201-250	5	5	4	5
251-300	4	4	4	4
301-350	4	3	3	3
351-400	3	4	5	5
401-450	4	5	4	3
451-500	3	3	3	4
Total	30	30	30	30

Perhitungan rata - rata diameter dan varians serat nano, menggunakan persamaan distribusi seragam kontinu.

Rata – Rata Ukuran Diameter Serat Nano	Rata – Rata Ukuran Diameter Serat Nano	Rata – Rata Ukuran Diameter Serat Nano	Rata – Rata Ukuran Diameter Serat Nano
PVA/TiO ₂ 0,3% :	PVA/TiO ₂ 0,4% :	PVA/TiO ₂ 0,5% :	PVA/TiO ₂ TP :
$\mu = \frac{(b + a)}{2}$ $\mu = \frac{(0,478 + 0,124)}{2}$ $\mu = \frac{0,602}{2}$ $\mu = 0,301 \mu m$ $\mu = 301 nm$	$\mu = \frac{(b + a)}{2}$ $\mu = \frac{(0,458 + 0,125)}{2}$ $\mu = \frac{0,581}{2}$ $\mu = 0,291 \mu m$ $\mu = 291 nm$	$\mu = \frac{(b + a)}{2}$ $\mu = \frac{(0,468 + 0,137)}{2}$ $\mu = \frac{0,605}{2}$ $\mu = 0,302 \mu m$ $\mu = 302 nm$	$\mu = \frac{(b + a)}{2}$ $\mu = \frac{(0,498 + 0,141)}{2}$ $\mu = \frac{0,639}{2}$ $\mu = 0,319 \mu m$ $\mu = 319 nm$
Varians :	Varians :	Varians :	Varians :

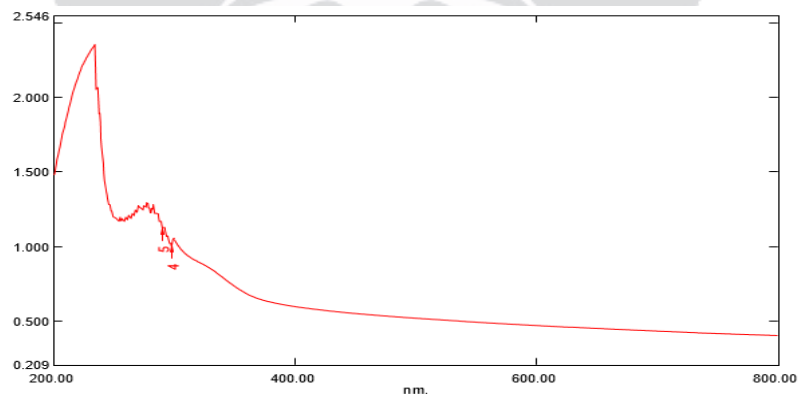
$V(x) = \frac{(b-a)^2}{12}$ $V(x) = \frac{(0,478 - 0,124)^2}{12}$ $V(x) = \frac{0,125316}{12}$ $V(x) = 0,010443$	$V(x) = \frac{(b-a)^2}{12}$ $V(x) = \frac{(0,458 - 0,125)^2}{12}$ $V(x) = \frac{0,110889}{12}$ $V(x) = 0,00924$	$V(x) = \frac{(b-a)^2}{12}$ $V(x) = \frac{(0,468 - 0,137)^2}{12}$ $V(x) = \frac{0,109561}{12}$ $V(x) = 0,00913$	$V(x) = \frac{(b-a)^2}{12}$ $V(x) = \frac{(0,498 - 0,141)^2}{12}$ $V(x) = \frac{0,127449}{12}$ $V(x) = 0,0106$
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C. Data Hasil Pengujian Spektrofotometer UV-Vis

C.1. Hasil Pengujian Spektrofotometer UV-Vis PVA-TiO₂ 0,3%

Tabel 7. Hasil Pengujian Spektrofotometer UV-Vis PVA-TiO₂ 0,3%

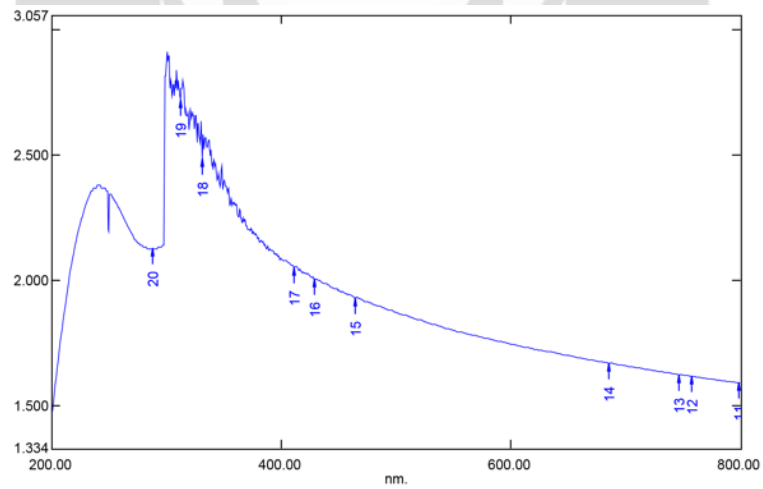
No.	P/V	Wavelength	Abs.	Description
1	↑	299.50	1.053	
2	↑	291.50	1.125	
3	↑	234.00	2.352	
4	↓	297.50	1.003	
5	↓	290.00	1.123	



C.2. Hasil Pengujian Spektrofotometer UV-Vis PVA-TiO₂ 0,4%

Tabel 8. Hasil Pengujian Spektrofotometer UV-Vis PVA-TiO₂ 0,4%

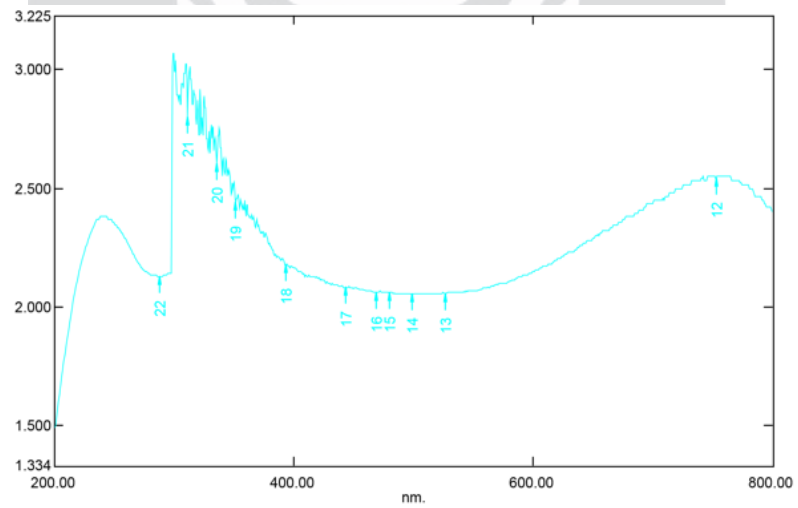
No.	P/V	Wavelength	Abs.	Description
1	●	759.50	1.620	
2	●	748.50	1.628	
3	●	687.50	1.673	
4	●	466.00	1.936	
5	●	430.50	2.008	
6	●	412.50	2.057	
7	●	337.00	2.561	
8	●	314.00	2.799	
9	●	300.50	2.914	
10	●	241.00	2.382	
11	●	798.50	1.593	
12	●	758.00	1.619	
13	●	747.00	1.625	
14	●	686.00	1.670	
15	●	464.00	1.931	
16	●	429.00	2.005	
17	●	411.00	2.054	
18	●	331.00	2.485	
19	●	312.00	2.723	
20	●	287.50	2.128	



C.3. Hasil Pengujian Spektrofotometer UV-Vis PVA-TiO₂ 0,5%

Tabel 9. Hasil Pengujian Spektrofotometer UV-Vis PVA-TiO₂ 0,5%

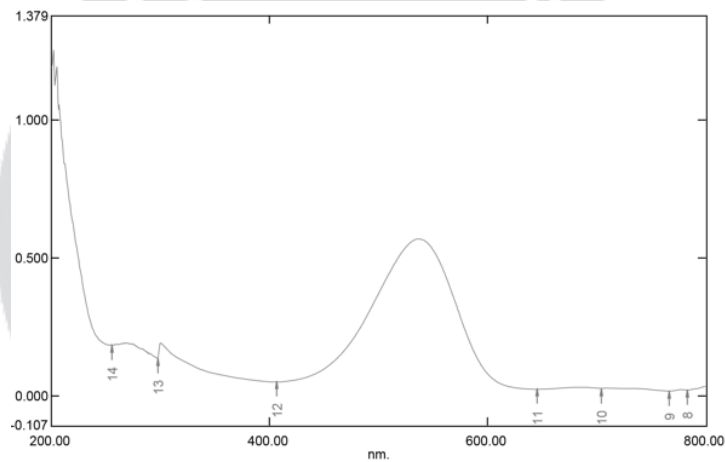
No.	P/V	Wavelength	Abs.	Description
1	↑	756.00	2.552	
2	↑	524.50	2.063	
3	↑	481.50	2.063	
4	↑	472.00	2.069	
5	↑	446.00	2.088	
6	↑	394.00	2.181	
7	↑	353.50	2.474	
8	↑	337.50	2.754	
9	↑	313.00	3.014	
10	↑	299.50	3.068	
11	↑	241.00	2.382	
12	↓	753.00	2.542	
13	↓	526.50	2.057	
14	↓	499.00	2.054	
15	↓	480.00	2.060	
16	↓	469.00	2.063	
17	↓	443.50	2.081	
18	↓	393.00	2.177	
19	↓	351.50	2.444	
20	↓	335.50	2.602	
21	↓	311.00	2.799	
22	↓	288.00	2.128	



C.4. Hasil Pengujian Spektrofotometer Ekstrak *Dye Sensitized*

Tabel 10. Hasil Pengujian Spektrofotometer UV-Vis Ekstrak *Dye Sensitized*

No.	P/V	Wavelength	Abs.	Description
1	↑	777.50	0.022	
2	↑	728.50	0.026	
3	↑	681.50	0.030	
4	↑	536.00	0.569	
5	↑	300.00	0.192	
6	↑	266.50	0.192	
7	↑	205.00	1.195	
8	↓	783.50	0.020	
9	↓	767.00	0.017	
10	↓	704.50	0.026	
11	↓	645.50	0.023	
12	↓	406.50	0.050	
13	↓	297.50	0.134	
14	↓	256.00	0.183	



D. Data Hasil Pengujian X-Ray Diffraction (XRD) TiO_2

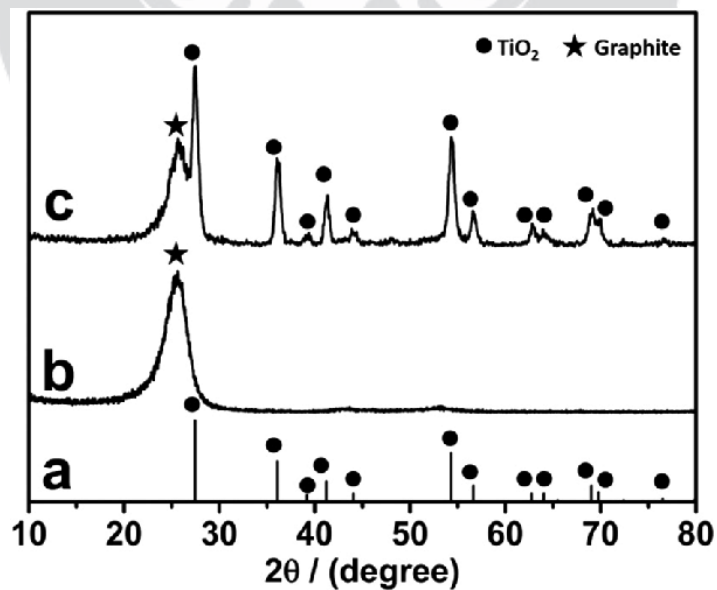
Phase Analysis Report

Index	Amount (%)	Name	Formula	sum
A	100.0	Titanium dioxide Anatase	TiO_2	
6.7		Unidentified peak area		

Peak List

Pos. [°2Th.]	Height [cts]	FWHM [°2Th.]	d-spacing [Å]	Rel. Int. [%]	Tip width [°2Th.]	Matched by
12,9950	94,87	0,5712	6,80716	7,33	0,6854	
24,1117	10,36	0,6528	3,68802	0,80	0,7834	
28,2116	21,32	0,4896	3,16067	1,65	0,5875	
31,7504	841,60	0,2448	2,81600	65,04	0,2938	
32,8020	77,53	0,2448	2,72809	5,99	0,2938	
34,4018	674,32	0,2448	2,60480	52,11	0,2938	
36,2454	1293,9	0,2448	2,47643	100,00	0,2938	
1						
47,5131	227,07	0,3264	1,91212	17,55	0,3917	
54,8999	13,14	0,2448	1,67103	1,02	0,2938	
56,5848	465,43	0,2448	1,62520	35,97	0,2938	
59,8485	20,07	0,9792	1,54414	1,55	1,1750	
62,8306	328,72	0,2448	1,47783	25,41	0,2938	
66,3873	62,05	0,2448	1,40702	4,80	0,2938	
67,8939	331,15	0,2448	1,37941	25,59	0,2938	

Pos. [°2Th.]	Height [cts]	FWHM [°2Th.]	d-spacing [Å]	Rel. Int. [%]	Tip width [°2Th.]	Matched by
69,1127	156,68	0,2856	1,35803	12,11	0,3427	
70,2686	23,21	0,2448	1,33850	1,79	0,2938	
70,8120	17,25	0,2448	1,32955	1,33	0,2938	
72,5704	8,46	0,9792	1,30161	0,65	1,1750	
75,6310	17,50	0,2448	1,25636	1,35	0,2938	
76,8786	38,27	0,2448	1,23905	2,96	0,2938	
78,4533	15,88	0,2448	1,21808	1,23	0,2938	



Gambar 1. Difraktogram berdasarkan data JCPDS No. 21-1276

E. Data Hasil Pengujian Kelistrikan DSSC

E.1. Pengukuran Arus

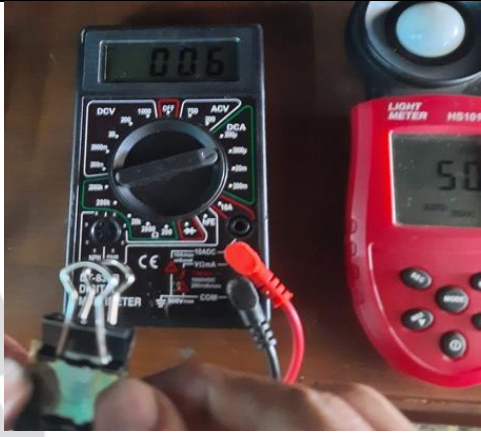
PVA/TiO ₂ 0,3%		PVA/TiO ₂ 0,4%		PVA/TiO ₂ 0,5%		TP	
Lux	Arus (mA)	Lux	Arus (mA)	Lux	Arus (mA)	Lux	Arus (mA)
50	0.03	80	0.06	50	0.06	50	0.03
734	0.11	681	0.14	828	0.24	750	0.048
1247	0.15	1347	0.22	1356	0.3	1350	0.081

E.2. Pengukuran Tegangan

PVA/TiO ₂ 0,3%		PVA/TiO ₂ 0,4%		PVA/TiO ₂ 0,5%		TP	
Lux	V (mV)	Lux	V (mV)	Lux	V (mV)	Lux	V (mV)
130	18.8	74	51.4	85	69.3	85	10
561	38	649	70.2	547	89.9	600	58.4
1209	82.2	1060	180.9	966	192.7	1060	80.4

Tabel 11 Data hasil pengujian arus *Dye Sensitized Solar Cell* dye sensitized buah naga merah

Konsentrasi TiO_2 pada DSSC	Pencahayaian Sinar Matahari		
	Langsung	Tidak Langsung	Ruangan Tertutup
PVA/ TiO_2 0,3%	 0.19 mA	 0.11 mA	 0.03 mA
PVA/ TiO_2 0,4%	 0.22 mA	 0.14 mA	 0.06 mA

Konsentrasi TiO_2 pada DSSC	Pencahayaian Sinar Matahari		
	Langsung	Tidak Langsung	Ruangan Tertutup
PVA/ TiO_2 0,5%			
	0.30 mA	0.24 mA	0.06 mA
PVA/ TiO_2 0,4% Tanpa Modifikasi Plasma			
	0.081 mA	0.048 mA	0.03 mA

Tabel 12. Data hasil pengujian tegangan *Dye Sensitized Solar Cell* dye sensitized buah naga merah

Konsentrasi TiO_2 pada DSSC	Pencahayaian Sinar Matahari		
	Langsung	Tidak Langsung	Ruangan Tertutup
PVA/ TiO_2 0,3%			
	82.2 mV	38 mV	18.8 mV
PVA/ TiO_2 0,4%			

	180.9 mV	70.2 mV	51.4 mV
PVA/TiO ₂ 0,5%			
	192.7 mV	89.9 mV	69.3 mV
PVA/TiO ₂ 0,4% Tanpa Modifikasi Plasma			
	80.4 mV	58.4 mV	10 mV