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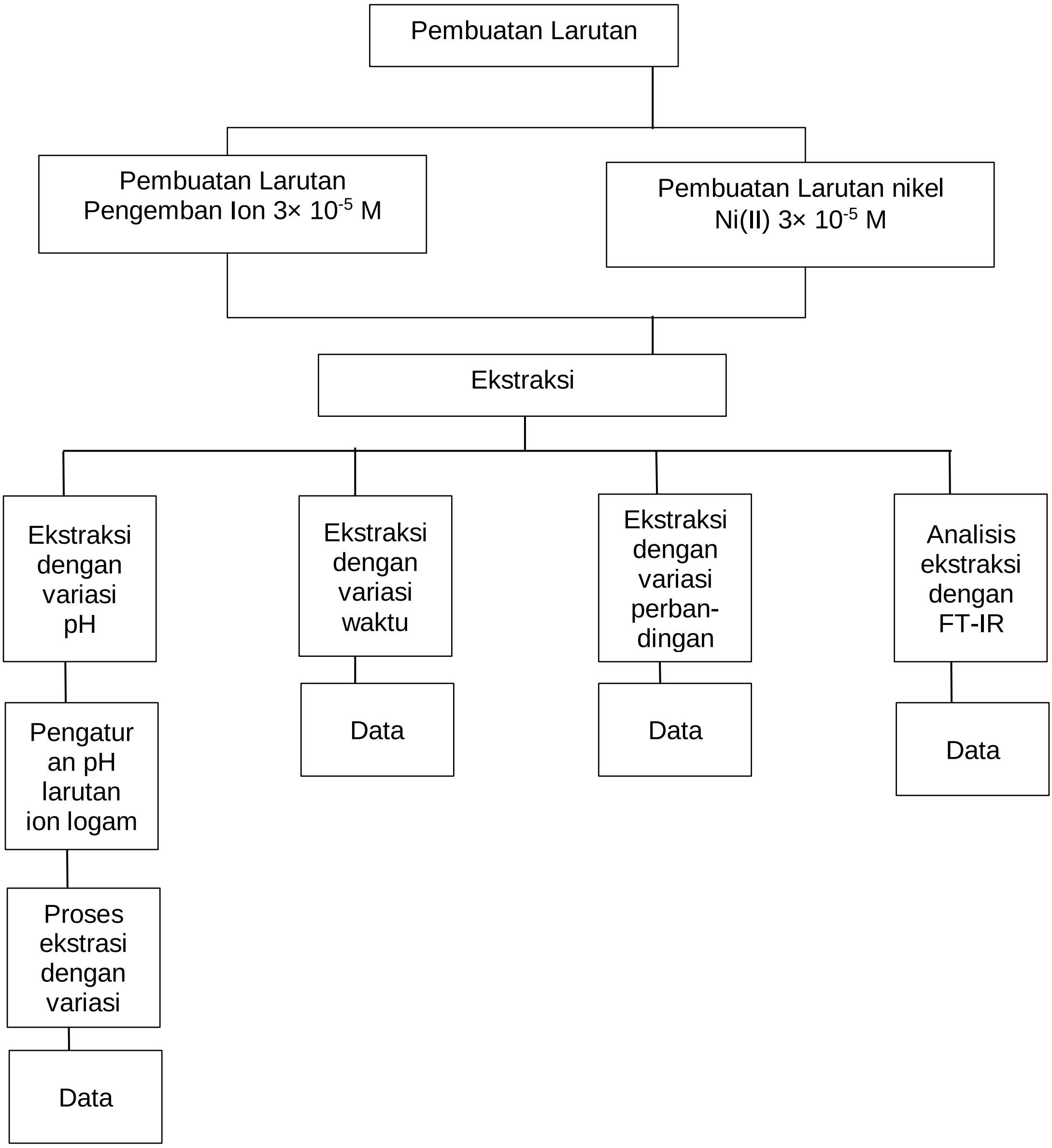
Lampiran 1. Diagram Alir



Lampiran 2. Bagan Kerja

a. Pembuatan larutan pengemban ion

0,0026 g *p-tert*-butilkaliks[4]arena-tetrakarboksilat

- Dimasukkan kedalam labu ukur 100 mL
- Dilarutkan dalam klorofom hingga volumenya menjadi 100 mL

Larutan pengemban ion 3,0 x 10^{-5} M

b. Pembuatan Induk Ni(II) 3,0 x 10^{-5} M dalam 100 mL

0,0055 g $NiNO_{3})_{2}$

- dilarutkan dengan akuades dalam labu ukur 100 mL
- dihomogenkan

Larutan Ni(II) 3,0 x 10^{-4} M

- dipipet 10 mL dimasukkan kedalam labu ukur 100 mL
- ditambahkan akuabides hingga tanda batas

Larutan Ni(II) 3,0 x 10^{-5} M

c. Ekstraksi dengan variasi pH

Larutan Ni(II) 1,0 x 10^{-4} M

- Dimasukkan 10 mL ke dalam erlenmeyer 50 mL
- Ditambahkan larutan setetes demi setetes HNO_3 0,1 M atau NaOH 0,1 M menggunakan mikropipet
- Diekstraksi dengan larutan asam *p-tert*-butilkaliks[4]arena-tetrakarboksilat sebanyak 10 mL menggunakan *stirrer*
- Konsentrasi logam yang diekstrak diukur menggunakan spektrofotometri serapan atom
- Diulangi prosedur untuk variasi pH 3, 4, 5, 6 dan 7
- Dibuat grafik antara pH dan konsetrasi logam yang diekstrak untuk menentukan pH optimum.

d. Ekstraksi dengan variasi waktu

Larutan Ni(II) 3,0 x 10^{-5} M

- Dimasukkan 10 mL ke dalam erlenmeyer 50 mL
- Diekstraksi dengan larutan asam *p-tert-*butilkaliks[4]arena-tetrakarboksilat sebanyak 10 mL menggunakan *stirrer* selama 5 menit.
- Konsentrasi logam yang diekstrak diukur menggunakan spektrofotometri serapan atom
- Diulangi prosedur untuk variasi waktu 10; 15 dan 20 menit
- Dibuat grafik antara pH dan konsetrasi logam yang diekstrak untuk menentukan waktu optimum.

Hasil

e. Pembuatan Induk Ni(II) 3,0 x 10^{-4} M dalam 50 mL

0,0027 g $NiNO_3)_2$

- dilarutkan dengan akuades dalam labu ukur 50 mL
- dihomogenkan

Larutan Ni(II) 3,0 x 10^{-4} M

f. Pembuatan larutan Ni(II) 1 x 10^{-5}; 2 x 10^{-5}; 3 x 10^{-5} M dalam 50 mL

Larutan Ni(II) 3 x 10^{-4} M

- dipipet sebanyak 5 mL dimasukkan ke dalam labu ukur 50 mL
- ditambahkan akuabides sampai tanda batas, dihomogenkan.

Larutan Ni(II) 3 x 10^{-5} M

Larutan Ni(II) 3,0 x 10^{-4} M

- dipipet sebanyak 3,3 mL dimasukkan ke dalam labu ukur 50 mL
- ditambahkan akuabides sampai tanda batas, dihomogenkan.

) 2 x 10^{-5} M

Larutan Ni(II) 3 x 10^{-4} M

- dipipet sebanyak 1,7 mL dimasukkan ke dalam labu ukur 50 mL
- ditambahkan akuabides sampai tanda batas, dihomogenkan.

Larutan Ni(II) 1 x 10^{-5} M

g. Ekstraksi dengan variasi perbandingan konsentrasi

Larutan Ni(II) 3,0 x 10^{-5} M

- dimasukkan 10 mL ke dalam erlenmeyer 50 mL
- diekstraksi dengan larutan asam *p-tert*-butilkaliks[4]arena-tetrakarboksilat sebanyak 10 mL menggunakan *stirrer* pada pH optimum selama 10 menit
- dipisahkan fasa air dan organik
- diukur ekstrak menggunakan spektrofotometri UV-Vis.
- diulangi prosedur untuk variasi perbandingan konsentrasi 1:2, 1:1, 2:1, 3:1.

Data

h. Analisis Kompleks *p-tert*-butilkaliks[4]arena-tetrakarboksilat dengan ion logam Ni(II) menggunakan FT-IR

Larutan Ni(II) 2,0 x 10^{-5} M

- dimasukkan 10 mL ke dalam erlenmeyer 50 mL
- diatur pH hingga 6 menggunakan HNO_3 0,1 M
- diekstraksi dengan larutan asam *p-tert*-butilkaliks[4]arena-tetrakarboksilat 1,0 x 10^{-5} M sebanyak 10 mL menggunakan *stirrer* selama 15 menit.
- dipisahkan fasa organik
- dianalisis menggunakan FT-IR

Hasil

Lampiran 3. Perhitungan

1. **Pembuatan larutan pengemban ion asam *p-tert*-butilkaliks[4]arena-tetrakarboksilat 3 x 10^{-5} M**

   G = M x Mr x L

   = 3 x 10^{-5} M x 881,16 g/mol x 0,1 L

   = 0,0029 gram

2. **Pembuatan larutan induk nikel 3 x 10^{-4} M dalam 100 mL**

   $M = \frac{G}{Mr} \times \frac{1000}{V}$

   G = M x Mr x L

   = 3 x 10^{-4} M x 182,7 g/mol x 0,1 L

   = 0,0055 gram

3. **Pembuatan larutan nikel 3 x 10^{-5} dalam 100 mL**

   $M_1 \times V_1 = M_2 \times V_2$

   3 x 10^{-4} M x V_1 = 3 x 10^{-5} M x 100 mL

   V_1 = 10 mL

4. **Pembuatan larutan induk nikel 3 x 10^{-4} M dalam 50 mL**

   $M = \frac{G}{Mr} \times \frac{1000}{V}$

   G = M x Mr x L

   = 3 x 10^{-4} M x 182,7 g/mol x 0,05 L

   = 0,0027 gram

5. **Pembuatan larutan Ni(II) 3 x 10^{-5} M, 2 x 10^{-4} M, 1 x 10^{-5} M dalam 50 mL**

   dalam 100 mL

   $V_1 = M_2 \times V_2$

   $_1$ = 3 x 10^{-5} x 100 mL

   $_1$ = 5 mL

b. Ni(II) 2 x 10^{-5} dalam 100 mL

$M_1 \times V_1 = M_2 \times V_2$

$3 \times 10^{-5} \times V_1 = 2 \times 10^{-5} \times 100$ mL

$V_1 = 3{,}3$ mL

c. Ni(II) 1 x 10^{-5} dalam 100 mL

$M_1 \times V_1 = M_2 \times V_2$

$3 \times 10^{-4} \times V_1 = 1 \times 10^{-5} \times 100$ mL

$V_1 = 1{,}7$ mL

6. Penbuatan Larutan HNO_3 0,1 M dalam 100 mL

$$M = \frac{Bj \times \% \times 10}{Mr}$$

$$M = \frac{1{,}3\ g/mL \times 65\ \% \times 10}{63\ g/mol}$$

$M = 13$ M

$M_1 \times V_1 = M_2 \times V_2$

$V_1 = 0{,}77$ mL

7. Pembuatan Larutan Induk 100 ppm sebanyak 100 mL

$$Massa = \frac{ppm \times V \times Mr\ Ni(NO_3)_2}{Ar\ Pb(NO_3)_2}$$

$$= \frac{100 \frac{mg}{L} \times 0{,}1\ L \times 182{,}7\ g/mol}{58{,}7}$$

$$= \frac{1.827}{58{,}7}$$

= 31,124 mg

= 0,0311 g

tan standar 0,1; 0,5; 1, 2, 3, 5 dan 10 ppm

L0 ppm dalam 100 mL

x V_2

100 ppm x V_1 = 10 ppm x 100 mL

V_1 = 10 mL

b. Konsentrasi 0,1 ppm dalam 50 mL

M_1 x V_1 = M_2 x V_2

10 ppm x V_1 = 0,1 ppm x 50 mL

V_1 = 0,5 mL

c. Konsentrasi 0,5 ppm dalam 50 mL

M_1 x V_1 = M_2 x V_2

10 ppm x V_1 = 0,5 ppm x 50 mL

V_1 = 2,5 mL

d. Konsentrasi 1 ppm dalam 50 mL

M_1 x V_1 = M_2 x V_2

10 ppm x V_1 = 1 ppm x 50 mL

V_1 = 5 mL

e. Konsentrasi 2 ppm dalam 50 mL

M_1 x V_1 = M_2 x V_2

10 ppm x V_1 = 2 ppm x 50 mL

V_1 = 10 mL

f. Konsentrasi 3 ppm dalam 50 mL

M_1 x V_1 = M_2 x V_2

= 4 ppm x 50 mL

= 15 mL

5 ppm dalam 50 mL

x V_2

$10 \text{ ppm} \times V_1 = 8 \text{ ppm} \times 50 \text{ mL}$

$V_1 = 25 \text{ mL}$

9. Konsentrasi Ni(II) terekstrak pada variasi pH

$$\text{Ekstrak Ni (\%)} = \frac{\text{Konsentrasi (Awal - Akhir)}}{\text{Konsentrasi Awal}} \times 100\%$$

a. pH 3

$$\% = \frac{(3 \times 10^{-5} - 1{,}16 \times 10^{-5})}{3 \times 10^{-5}} \times 100\%$$

$= 61{,}33\ \%$

b. pH 4

$$\% = \frac{(3 \times 10^{-5} - 1{,}10 \times 10^{-5})}{3 \times 10^{-5}} \times 100\%$$

$= 63{,}33\ \%$

c. pH 5

$$\% = \frac{(3 \times 10^{-5} - 1{,}07 \times 10^{-5})}{3 \times 10^{-5}} \times 100\%$$

$= 64{,}33\ \%$

d. pH 6

$$\% = \frac{(3 \times 10^{-5} - 0{,}10 \times 10^{-5})}{3 \times 10^{-5}} \times 100\%$$

$= 96{,}67\ \%$

e. pH 7

$$\% = \frac{(3 \times 10^{-5} - 0{,}16 \times 10^{-5})}{3 \times 10^{-5}} \times 100\%$$

$= 94{,}67\ \%$

I) terekstrak pada variasi waktu

$$\frac{\text{ntrasi (Awal - Akhir)}}{\text{onsentrasi Awal}} \times 100\%$$

a. 5 menit

$$\% = \frac{(3 \times 10^{-5} - 1{,}86 \times 10^{-5})}{3 \times 10^{-5}} \text{ x } 100\%$$

$$= 38\ \%$$

b. 10 menit

$$\% = \frac{(3 \times 10^{-5} - 1{,}70 \times 10^{-5})}{3 \times 10^{-5}} \text{ x } 100\%$$

$$= 43{,}33\ \%$$

c. 15 menit

$$\% = \frac{(3 \times 10^{-5} - 1{,}59 \times 10^{-5})}{3 \times 10^{-5}} \text{ x } 100\%$$

$$= 47\ \%$$

d. 20 menit

$$\% = \frac{(3 \times 10^{-5} - 1{,}73 \times 10^{-5})}{3 \times 10^{-5}} \text{ x } 100\%$$

$$= 42{,}33\ \%$$

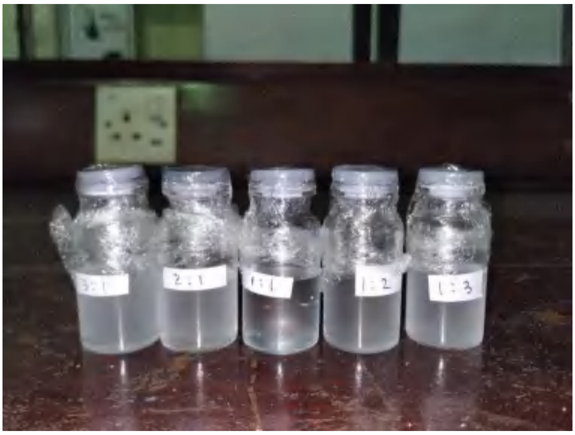
Lampiran 4. Dokumentasi Penelitian

Pembuatan larutan pengemban ion (*p*-*tert*-butilkaliks[4]arena-tetrakarboksilat
$3,0 \times 10^{-5}$ M

Pembuatan larutan induk Ni(II)
$3,0 \times 10^{-5}$ M

n variasi pH

Ekstraksi dengan variasi waktu



Ekstraksi dengan variasi perbandingan konsentrasi

Ekstraksi menggunakan *magnetic stirrer*

Analisis menggunakan FT-IR Prestige-21

Analisis menggunakan UV-Vis T60


Analisis menggunakan spektrofotometri serapan atom

Lampiran 5. Data Hasil AAS

1. **Data Ekstrak Ni(II) terhadap variasi pH**

pH	Abs	Konsentrasi (10^{-5} M)	%terkstrak
3	0,0185	1,16	61,33
4	0,0177	1,10	63,33
5	0,0173	1,07	64,33
6	0,0033	0,10	96,67
7	0,0041	0,16	94,67

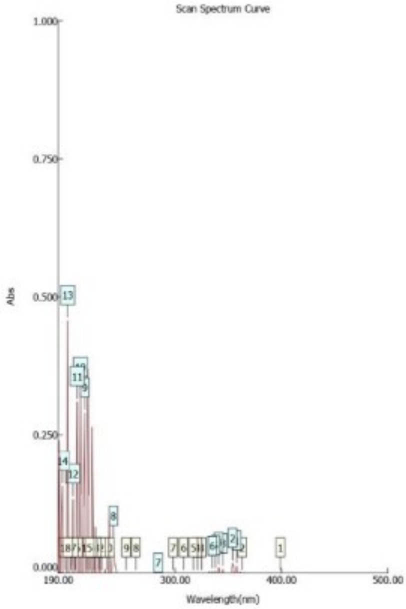
2. **Data Ekstrak Ni(II) terhadap variasi Waktu**

waktu kontak	Abs	Konsentrasi (10^{-5} M)	% terekstrak
5	0,0287	1,86	38
10	0,0263	1,70	43,33
15	0,0249	1,59	47
20	0,0255	1,73	42,33

Lampiran 6. Data Spektrum UV-Vis

1. ***p-tert*-butilkaliks[4]arena-tetrakarboksilat tanpa penambahan logam**

Kaliks 1.spd Kaliks 1.spd Spectrum



- **Instrument Performance**
  Model : UV-VIS Spectrophotometer
  Number : 28-1650-01-1349
  Spectral Bandwidth : 1.00 nm
- **Scan Spectrum Performance**
  Scan Range : 190.00 to 500.00 nm
  Measure Mode : Abs
  Interval : 1.00 nm
  Speed : Fast
  Data File : E:\Kaliks 1.spd
  Create Date/Time : Wednesday, August 2, 2023 12:31:21 AM
  Data Type : Original
  Method File:
- **Analyse Note**
  Analyser : Administrator
  Sample Name :
  Comment :

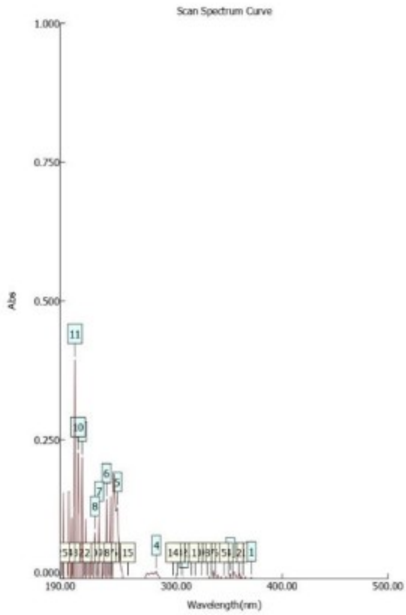
No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	358.00	0.012	
2	Peak	354.00	0.017	
3	Peak	345.00	0.007	
4	Peak	341.00	0.010	
5	Peak	338.00	0.004	
6	Peak	335.00	0.003	
7	Peak	284.00	-0.028	
8	Peak	242.00	0.057	
9	Peak	215.00	0.290	
10	Peak	211.00	0.326	
11	Peak	208.00	0.310	
12	Peak	204.00	0.133	
13	Peak	199.00	0.457	
14	Peak	194.00	0.157	
1	Valley	399.00	-0.006	
2	Valley	363.00	-0.008	
3	Valley	325.00	-0.015	
4	Valley	321.00	-0.022	
5	Valley	317.00	-0.023	

Kaliks 2.spd Kaliks 2.spd Spectrum

- **Instrument Performance**
  Model : UV-VIS Spectrophotometer
  Number : 28-1650-01-1349
  Spectral Bandwidth : 1.00 nm
- **Scan Spectrum Performance**
  Scan Range : 190.00 to 500.00 nm
  Measure Mode : Abs
  Interval : 1.00 nm
  Speed : Fast
  Data File : E:\Kaliks 2.spd
  Create Date/Time : Wednesday, August 2, 2023 12:33:34 AM
  Data Type : Original
  Method File:
- **Analyse Note**
  Analyser : Administrator
  Sample Name :
  Comment :

No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	385.00	0.000	
2	Peak	382.00	-0.001	
3	Peak	371.00	0.004	
4	Peak	358.00	0.009	
5	Peak	354.00	0.017	
6	Peak	342.00	0.013	
7	Peak	310.00	-0.010	
8	Peak	281.00	-0.010	
9	Peak	244.00	0.077	
10	Peak	241.00	0.154	
11	Peak	238.00	0.120	
12	Peak	234.00	0.153	
13	Peak	204.00	0.120	
14	Peak	199.00	0.277	
15	Peak	194.00	0.261	
16	Peak	192.00	0.141	
1	Valley	375.00	-0.007	
2	Valley	367.00	-0.003	
3	Valley	360.00	-0.008	

Kaliks 3 duplo.spd | Kaliks 3 duplo.spd | Spectrum

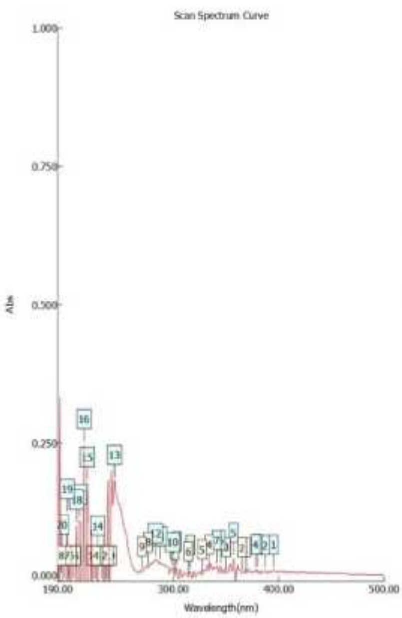


- **Instrument Performance**
  - Model : UV-VIS Spectrophotometer
  - Number : 28-1650-01-1349
  - Spectral Bandwidth : 1.00 nm
- **Scan Spectrum Performance**
  - Scan Range : 190.00 to 500.00 nm
  - Measure Mode : Abs
  - Interval : 1.00 nm
  - Speed : Fast
  - Data File : E:\Kaliks 3 duplo.spd
  - Create Date/Time : Wednesday, August 2, 2023 12:35:51 AM
  - Data Type : Original
  - Method File:
- **Analyse Note**
  - Analyser : Administrator
  - Sample Name :
  - Comment :

No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	371.00	0.002	
2	Peak	351.00	0.009	
3	Peak	307.00	-0.010	
4	Peak	281.00	0.013	
5	Peak	244.00	0.127	
6	Peak	234.00	0.143	
7	Peak	227.00	0.110	
8	Peak	223.00	0.083	
9	Peak	211.00	0.218	
10	Peak	207.00	0.226	
11	Peak	204.00	0.394	
1	Valley	363.00	-0.006	
2	Valley	359.00	-0.008	
3	Valley	353.00	-0.009	
4	Valley	349.00	-0.017	
5	Valley	345.00	-0.009	
6	Valley	337.00	-0.012	
7	Valley	333.00	-0.009	
8	Valley	329.00	-0.010	

2. Spektrum UV-Vis *p-tert*-butilkaliks[4]arena-tetrakarboksilat dengan penambahan ion logam Ni(II) dengan perbandingan 1:3

1_3 duplo.spd 1_3 duplo.spd Spectrum



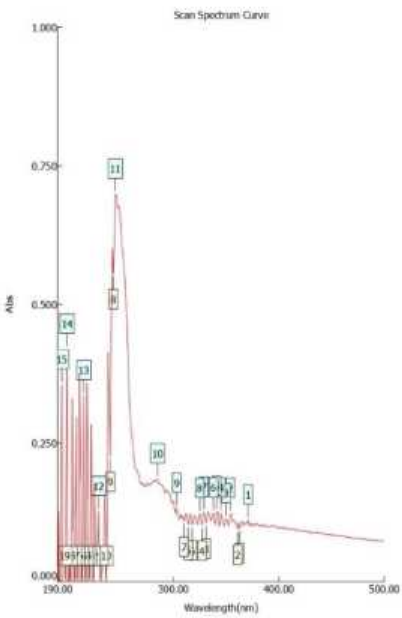
- **Instrument Performance**
  Model : UV-VIS Spectrophotometer
  Number : 28-1650-01-1349
  Spectral Bandwidth : 1.00 nm
- **Scan Spectrum Performance**
  Scan Range : 190.00 to 500.00 nm
  Measure Mode : Abs
  Interval : 1.00 nm
  Speed : Fast
  Data File : E:\1_3 duplo.spd
  Create Date/Time : Wednesday, August 2, 2023 12:46:48 AM
  Data Type : Original
  Method File:
- **Analyse Note**
  Analyser : Administrator
  Sample Name :
  Comment :

No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	395.00	0.019	
2	Peak	387.00	0.019	
3	Peak	380.00	0.021	
4	Peak	378.00	0.020	
5	Peak	357.00	0.041	
6	Peak	345.00	0.028	
7	Peak	341.00	0.028	
8	Peak	316.00	0.019	
9	Peak	303.00	0.025	
10	Peak	299.00	0.024	
11	Peak	287.00	0.035	
12	Peak	283.00	0.040	
13	Peak	244.00	0.182	
14	Peak	228.00	0.054	
15	Peak	218.00	0.178	
16	Peak	215.00	0.247	
17	Peak	211.00	0.111	
18	Peak	208.00	0.101	
19	Peak	199.00	0.120	
20	Peak	194.00	0.056	
1	Valley	369.00	0.015	
2	Valley	365.00	0.015	
3	Valley	350.00	0.015	
4	Valley	334.00	0.020	
5	Valley	327.00	0.011	
6	Valley	314.00	0.008	
7	Valley	301.00	0.010	
8	Valley	276.00	0.024	
9	Valley	270.00	0.017	
10	Valley	239.00	-0.052	
11	Valley	236.00	-0.254	
12	Valley	232.00	-0.189	
13	Valley	226.00	-0.049	
14	Valley	224.00	-0.122	
15	Valley	205.00	-0.138	
16	Valley	201.00	-0.281	
17	Valley	196.00	-0.301	
18	Valley	191.00	-0.190	

1_3 duplo.spd 1_3 duplo.spd Spectrum

3. Spektrum UV-Vis *p-tert*-butilkaliks[4]arena-tetrakarboksilat dengan penambahan ion logam Ni(II) dengan perbandingan 1:2

1_2 duplo.spd 1_2 duplo.spd Spectrum



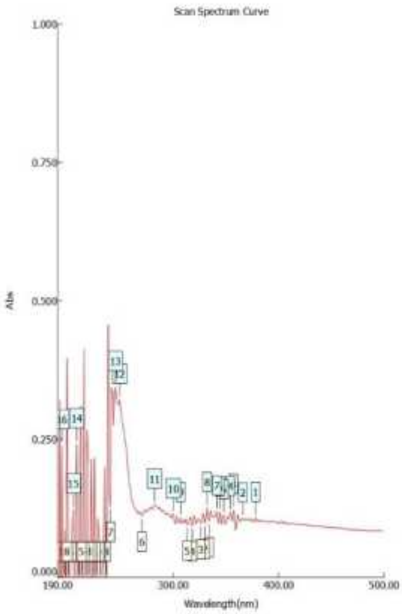
- **Instrument Performance**
  Model : UV-VIS Spectrophotometer
  Number : 28-1650-01-1349
  Spectral Bandwidth : 1.00 nm
- **Scan Spectrum Performance**
  Scan Range : 190.00 to 500.00 nm
  Measure Mode : Abs
  Interval : 1.00 nm
  Speed : Fast
  Data File : E:\1_2 duplo.spd
  Create Date/Time : Wednesday, August 2, 2023 12:44:51 AM
  Data Type : Original
  Method File:
- **Analyse Note**
  Analyser : Administrator
  Sample Name :
  Comment :

No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	371.00	0.111	
2	Peak	354.00	0.122	
3	Peak	350.00	0.113	
4	Peak	345.00	0.123	
5	Peak	341.00	0.126	
6	Peak	338.00	0.123	
7	Peak	329.00	0.124	
8	Peak	325.00	0.122	
9	Peak	303.00	0.132	
10	Peak	285.00	0.184	
11	Peak	245.00	0.699	
12	Peak	229.00	0.125	
13	Peak	215.00	0.335	
14	Peak	199.00	0.418	
15	Peak	194.00	0.354	
1	Valley	363.00	0.097	
2	Valley	361.00	0.095	
3	Valley	331.00	0.106	
4	Valley	327.00	0.102	
5	Valley	318.00	0.102	
6	Valley	314.00	0.103	
7	Valley	310.00	0.109	
8	Valley	243.00	0.556	
9	Valley	240.00	0.226	
10	Valley	236.00	-0.018	
11	Valley	231.00	-0.065	
12	Valley	224.00	-0.107	
13	Valley	220.00	-0.234	
14	Valley	217.00	-0.200	
15	Valley	213.00	-0.277	
16	Valley	209.00	-0.172	
17	Valley	206.00	-0.203	
18	Valley	202.00	-0.089	
19	Valley	197.00	-0.152	

1_2 duplo.spd 1_2 duplo.spd Spectrum

4. Spektrum UV-Vis *p-tert*-butilkaliks[4]arena-tetrakarboksilat dengan penambahan ion logam Ni(II) dengan perbandingan 1:1

1_1 duplo.spd 1_1 duplo.spd Spectrum



- **Instrument Performance**
  - Model : UV-VIS Spectrophotometer
  - Number : 28-1650-01-1349
  - Spectral Bandwidth : 1.00 nm
- **Scan Spectrum Performance**
  - Scan Range : 190.00 to 500.00 nm
  - Measure Mode : Abs
  - Interval : 1.00 nm
  - Speed : Fast
  - Data File : E:\1_1 duplo.spd
  - Create Date/Time : Wednesday, August 2, 2023 12:42:52 AM
  - Data Type : Original
  - Method File:
- **Analyse Note**
  - Analyser : Administrator
  - Sample Name :
  - Comment :

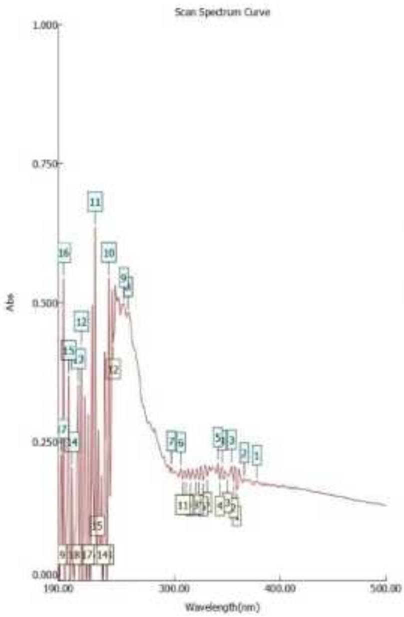
No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	378.00	0.108	
2	Peak	366.00	0.107	
3	Peak	357.00	0.122	
4	Peak	354.00	0.119	
5	Peak	348.00	0.113	
6	Peak	344.00	0.118	
7	Peak	341.00	0.119	
8	Peak	332.00	0.126	
9	Peak	307.00	0.107	
10	Peak	300.00	0.114	
11	Peak	282.00	0.132	
12	Peak	249.00	0.321	
13	Peak	245.00	0.344	
14	Peak	208.00	0.241	
15	Peak	205.00	0.123	
16	Peak	194.00	0.239	
1	Valley	334.00	0.102	
2	Valley	330.00	0.098	
3	Valley	326.00	0.098	

1_1 duplo.spd 1_1 duplo.spd Spectrum

4	Valley	318.00	0.094
5	Valley	313.00	0.095
6	Valley	270.00	0.111
7	Valley	240.00	0.129
8	Valley	236.00	-0.151
9	Valley	231.00	-0.079
10	Valley	227.00	-0.006
11	Valley	224.00	-0.106
12	Valley	220.00	-0.280
13	Valley	217.00	-0.270
14	Valley	213.00	-0.259
15	Valley	210.00	-0.147
16	Valley	201.00	-0.150
17	Valley	198.00	-0.057
18	Valley	196.00	-0.205

5. Spektrum UV-Vis *p-tert*-butilkaliks[4]arena-tetrakarboksilat dengan penambahan ion logam Ni(II) dengan perbandingan 2:1

2_1 duplo.spd 2_1 duplo.spd Spectrum



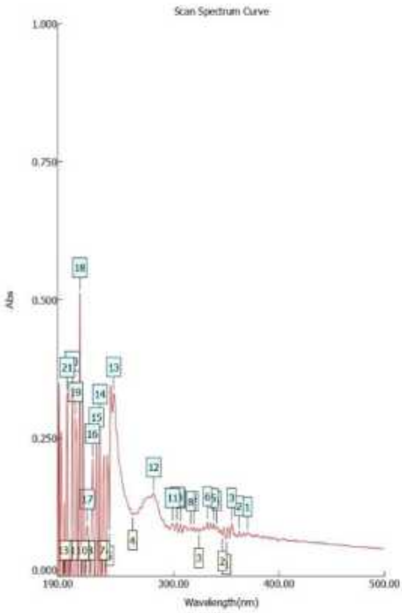
- **Instrument Performance**
  Model : UV-VIS Spectrophotometer
  Number : 28-1650-01-1349
  Spectral Bandwidth : 1.00 nm
- **Scan Spectrum Performance**
  Scan Range : 190.00 to 500.00 nm
  Measure Mode : Abs
  Interval : 1.00 nm
  Speed : Fast
  Data File : E:\2_1 duplo.spd
  Create Date/Time : Wednesday, August 2, 2023 12:40:53 AM
  Data Type : Original
  Method File:
- **Analyse Note**
  Analyser : Administrator
  Sample Name :
  Comment :

No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	378.00	0.179	
2	Peak	366.00	0.183	
3	Peak	354.00	0.207	
4	Peak	345.00	0.205	
5	Peak	341.00	0.211	
6	Peak	306.00	0.202	
7	Peak	297.00	0.205	
8	Peak	256.00	0.482	
9	Peak	252.00	0.499	
10	Peak	238.00	0.544	
11	Peak	225.00	0.635	
12	Peak	212.00	0.420	
13	Peak	209.00	0.353	
14	Peak	203.00	0.203	
15	Peak	200.00	0.368	
16	Peak	195.00	0.543	
17	Peak	193.00	0.226	
1	Valley	359.00	0.164	
2	Valley	356.00	0.178	
3	Valley	350.00	0.187	
4	Valley	343.00	0.181	
5	Valley	331.00	0.187	
6	Valley	327.00	0.180	
7	Valley	323.00	0.183	
8	Valley	320.00	0.184	
9	Valley	315.00	0.181	
10	Valley	311.00	0.184	
11	Valley	308.00	0.184	
12	Valley	242.00	0.427	
13	Valley	236.00	-0.071	
14	Valley	232.00	-0.047	
15	Valley	227.00	0.052	
16	Valley	220.00	-0.231	
17	Valley	217.00	-0.217	
18	Valley	205.00	-0.001	
19	Valley	191.00	-0.090	

2_1 duplo.spd 2_1 duplo.spd Spectrum

Spektrum UV-Vis *p-tert*-butilkaliks[4]arena-tetrakarboksilat dengan penambahan ion logam Ni(II) dengan perbandingan 3:1

3_1 triplo.spd | 3_1 triplo.spd | Spectrum



- **Instrument Performance**
  Model : UV-VIS Spectrophotometer
  Number : 28-1650-01-1349
  Spectral Bandwidth : 1.00 nm
- **Scan Spectrum Performance**
  Scan Range : 190.00 to 500.00 nm
  Measure Mode : Abs
  Interval : 1.00 nm
  Speed : Fast
  Data File : E:\3_1 triplo.spd
  Create Date/Time : Wednesday, August 2, 2023 12:38:44 AM
  Data Type : Original
  Method File:
- **Analyse Note**
  Analyser : Administrator
  Sample Name :
  Comment :

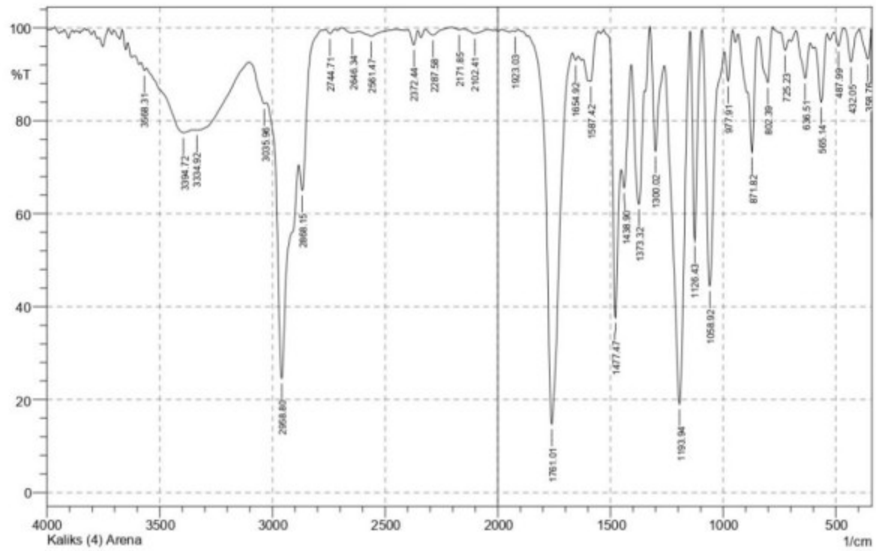
No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	370.00	0.079	
2	Peak	362.00	0.081	
3	Peak	355.00	0.095	
4	Peak	341.00	0.090	
5	Peak	338.00	0.095	
6	Peak	332.00	0.098	
7	Peak	319.00	0.089	
8	Peak	316.00	0.088	
9	Peak	307.00	0.094	
10	Peak	303.00	0.096	
11	Peak	299.00	0.095	
12	Peak	281.00	0.150	
13	Peak	243.00	0.332	
14	Peak	230.00	0.283	
15	Peak	227.00	0.241	
16	Peak	223.00	0.211	
17	Peak	218.00	0.093	
18	Peak	211.00	0.512	
19	Peak	207.00	0.286	
20	Peak	204.00	0.342	
21	Peak	199.00	0.331	
1	Valley	350.00	0.068	
2	Valley	346.00	0.074	
3	Valley	324.00	0.080	
4	Valley	261.00	0.112	
5	Valley	239.00	0.084	
6	Valley	235.00	-0.101	
7	Valley	232.00	-0.182	
8	Valley	221.00	-0.090	
9	Valley	216.00	-0.074	
10	Valley	213.00	-0.106	
11	Valley	202.00	-0.264	
12	Valley	197.00	-0.308	
13	Valley	195.00	-0.139	

3_1 triplo.spd | 3_1 triplo.spd | Spectrum

Lampiran 7. Data Hasil FT-IR

1. FT-IR *p-tert*-butilkaliks[4]arena-tetrakarboksilat (padat)

SHIMADZU



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	358.76	93.297	6.47	397.34	343.33	0.887	0.835
2	432.05	92.651	7.206	464.84	397.34	0.908	0.866
3	487.99	96.057	3.422	509.21	464.84	0.389	0.292
4	565.14	84.004	13.35	592.15	540.07	2.202	1.593
5	636.51	89.164	8.464	675.09	615.29	1.754	1.219
6	725.23	95.207	2.986	746.45	707.88	0.53	0.237
7	802.39	88.207	11.22	840.96	781.17	1.891	1.667
8	871.82	73.265	17.675	891.11	842.89	3.299	1.637
9	977.91	88.532	8.363	993.34	958.62	1.084	0.666
10	1058.92	44.421	53.518	1093.64	995.27	13.106	11.87
11	1126.43	54.143	45.16	1145.72	1095.57	5.565	5.423
12	1193.94	19.065	77.046	1259.52	1147.65	32.017	29.758
13	1300.02	73.463	23.468	1325.1	1261.45	4.402	3.223
14	1373.32	62.068	26.544	1408.04	1350.17	7.699	4.782
15	1438.9	65.575	10.979	1452.4	1409.96	5.354	1.322
16	1477.47	37.623	44.952	1504.48	1454.33	11.034	6.694
17	1587.42	88.502	1.736	1593.2	1554.63	0.992	0.102
18	1654.92	93.046	1.163	1668.43	1643.35	0.718	0.071
19	1761.01	14.732	81.559	1863.24	1670.35	40.703	37.603
20	1923.03	99.225	0.276	1936.53	1911.46	0.07	0.015
21	2102.41	98.779	0.932	2152.56	2048.4	0.338	0.206
22	2171.85	99.613	0.288	2204.64	2152.56	0.043	0.03
23	2287.58	98.447	1.329	2320.37	2204.64	0.327	0.263
24	2372.44	96.345	3.146	2397.52	2355.08	0.376	0.285
25	2561.47	98.194	1.187	2615.47	2453.45	0.704	0.324
26	2646.34	98.949	0.611	2692.63	2615.47	0.242	0.122
27	2744.71	98.732	0.944	2763.99	2723.49	0.136	0.079
28	2868.15	65.042	9.878	2883.58	2783.28	6.652	1.11
[illegible]	[illegible]	[illegible]593	52.736	3026.31	2885.51	36.857	20.61
[illegible]	[illegible]	[illegible]696	1.067	3101.54	3028.24	4.173	0.2
[illegible]	[illegible]	[illegible]998	0.862	3348.42	3103.46	18.704	1.612
[illegible]	[illegible]	[illegible]438	3.465	3556.74	3350.35	16.922	1.673
[illegible]	[illegible]	[illegible]82	0.985	3583.74	3558.67	0.968	0.053

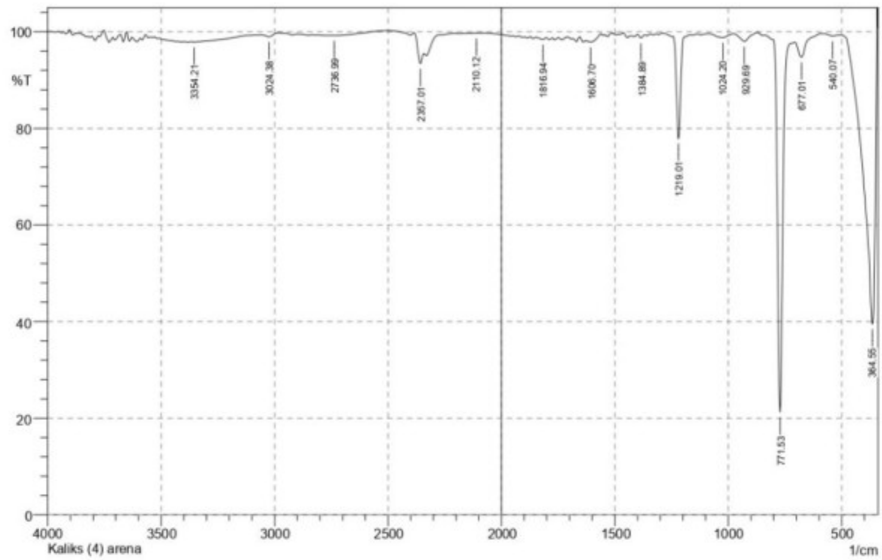
Date/Time; 10/30/2023 5:35:10 PM

No. of Scans;

2. FT-IR *p-tert*-butilkaliks[4]arena-tetrakarboksilat (cair)

3.

SHIMADZU

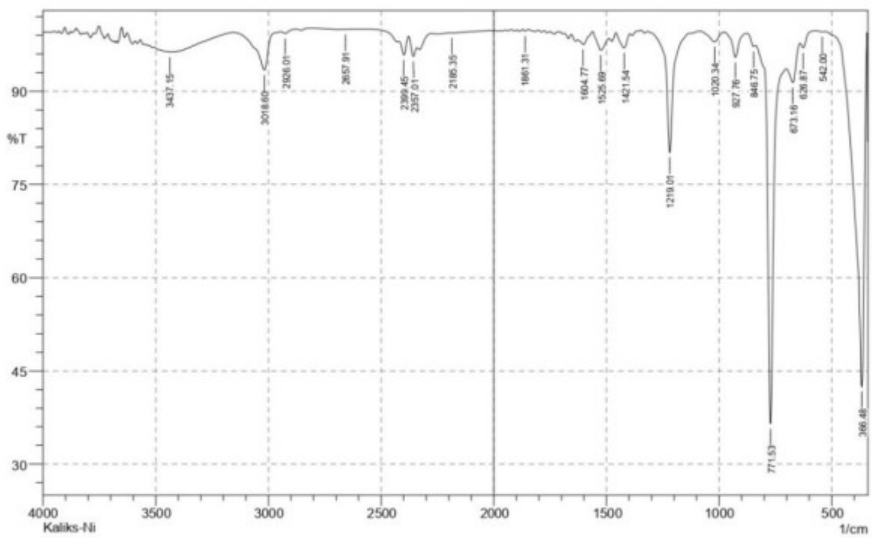


	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	364.55	39.54	65.16	503.42	343.33	20.29	21.95
2	540.07	99.13	0.31	594.08	503.42	0.25	0.04
3	677.01	94.76	3.52	705.95	594.08	1.14	0.52
4	771.53	21.28	76.9	800.46	707.88	14.02	13.24
5	929.69	98	1.72	977.91	871.82	0.47	0.34
6	1024.2	98.81	0.79	1085.92	977.91	0.38	0.19
7	1219.01	78.03	20.92	1242.16	1195.87	2.2	1.99
8	1384.89	98.73	0.68	1400.32	1365.6	0.14	0.05
9	1606.7	97.84	0.13	1627.92	1602.85	0.22	0.01
10	1816.94	98.4	0.4	1845.88	1803.44	0.26	0.04
11	2110.12	99.71	0.01	2115.91	2092.77	0.03	0
12	2357.01	93.43	3.56	2385.95	2341.58	0.77	0.3
13	2736.99	99.23	0.05	2748.56	2497.82	0.31	0.03
14	3024.38	98.97	0.56	3059.1	2980.02	0.23	0.08
15	3354.21	97.88	0.08	3367.71	3336.85	0.28	0.01

Date/Time; 12/13/2023 1:56:27 PM
No. of Scans;
Resolution;
Apodization;

FT-IR *p-tert*-butilkaliks[6]arena-tetrakarboksilat penambahan ion logam Ni(II) (cair)

SHIMADZU



No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	366.48	42.54	54.25	528.5	345.26	15.92	14.3
2	542	99.57	0.09	570.93	528.5	0.07	0.01
3	626.87	97	1.12	640.37	570.93	0.4	0.02
4	673.16	91.4	4.19	702.09	642.3	1.68	0.54
5	771.53	36.5	59	837.11	704.02	12.55	9.85
6	846.75	97.21	0.62	877.61	837.11	0.32	0.03
7	927.76	95.48	3.95	977.91	877.61	0.81	0.56
8	1020.34	97.97	1.63	1085.92	977.91	0.52	0.33
9	1219.01	80.19	19.29	1315.45	1132.21	3.66	3.24
10	1421.54	96.99	2.33	1458.18	1396.46	0.52	0.35
11	1525.69	96.64	2.44	1560.41	1489.05	0.7	0.41
12	1604.77	97.55	0.06	1627.92	1602.85	0.23	0
13	1861.31	99.7	0.26	1870.95	1845.88	0.02	0.01
14	2185.35	99.38	0.02	2193.06	2090.84	0.22	0
15	2357.01	95.63	2.15	2378.23	2341.58	0.51	0.18
16	2399.45	95.86	2.57	2420.66	2378.23	0.52	0.23
17	2657.91	99.97	0.01	2671.41	2627.05	0	0
18	2926.01	99.31	0.4	2945.3	2875.86	0.1	0.04
19	3018.6	93.42	6.14	3155.54	2945.3	2.09	1.67
20	3437.15	96.31	0.18	3508.52	3421.72	1.32	0.06

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No. of Scans;
Resolution;
Apodization;