DAFTAR PUSTAKA

Agustino, 2016, *Pengaruh Variasi Aktivasi KOH dengan Radiasi Gelombang Mikro Pada Elektroda Karbon dari Tempurung Kelapa terhadap Sifat Fisis dan Elektrokimia Sel Superkapasitor*, Skripsi tidak diterbitkan, Program Studi Fisika, Fakultas MIPA, Universitas Riau, Pekanbaru.

Ajay, K. M., Dinesh, M. N., Byatarayappa, G., Radhika, M.G., Kathyayini, N., dan Vijeth, H., 2021, Electrochemical investigations on low-cost KOH activated carbon derived, from orange-peel and polyaniline for hybrid supercapacitors, *Inorganic Chemistry Communications* 127.

Azdarani, C. M., 2021, *Pengaruh Variasi Konsentrasi Aktivator Kimia KOH terhadap Kapasistansi Spesifik Elektroda Karbon Superkapasitor dari Daun Sukun (Artocarpus altilis)*, Skripsi, jurusan Fisika, Fakultas MIPA, Universitas Hasanuddin, Makassar.

CNN Indonesia, 16 November 2021, *Daftar Energi Alternatif di Dunia dan Cara Kerjanya*, diakses pada 1 November 2022, dari https://www.cnnindonesia.com/teknologi/20211116080052-199-721675/daftar-energi-alternatif-di-dunia-dan-cara-kerjanya.

Gharsallah, K., Rezig, L., Msaada, K., Chalh, A., Soltani, T., 2021, Chemical composition and profile characterization of *Moringa oleifera* seed oil, *South African Journal of Botany* 137: 475-482.

González, A., Goikolea, E., Barrena, J. A., dan Mysyk, R., 2016, Review on Supercapacitors: Technologies and Materials, *Renewable and Sustainable Energy Reviews* 28: 1189-1206.

Goyal, H. B., Seal, D., dan Saxena, R. C., 2008, Bio-fuels from thermochemical conversion of renewable resources; a review, *Renew Sustain Energy Reviews* 12: 504-517.

Kongthong, T., Poochai, C., Sriprachuabwong, C., Tuantranont, A., Nanan, S., Meethong, N., Pakawatpanurut, P., Amornsakchai, T., dan Sodtipinta, J., 2022, Microwave-assisted Synthesis of Nitrogen-doped pineapple leaf fiber-derived activated carbon with manganese dioxide nanofibers for high-performance coin- and pouch-cell supercapacitors, *Journal of Sciens: Advance Materials and Devices* 7(**2**): 100434

Kötz, R dan Carlen, M., 2000, Principles and Applications of Electrochemical Capacitors, *Electrochimica Acta* 45: 2483-2498.

Lambert, J.B., Shurvell, H. F., dan Cooks, R. G., 1987, Introduction to organic spectroscopy, Macmillan: New York.

Maulana, A. I., 2021, *Pengaruh Suhu terhadap Kualitas Karbon Tempurung Kemiri (Aleurites moluccana) Teraktivasi H_3PO_4 sebagai Bahan Elektroda Superkapasitor*, Skripsi tidak diterbitkan, jurusan Kimia, Fakultas MIPA, Universitas Hasanuddin, Makassar.

Mecozzi, M., Pietroletti, M., dan Scarpiniti, M., 2011, Monitoring of marine mucilage formation in italian seas investigated by infrared spectroscopy and independent component analysis, *Environmental Monitoring and Assessment*, 184(**10**): 6025-6036.

Natalia, K dan Taer, E., 2019, Pengaruh Suhu Aktivasi Terhadap Sifat Fisis dan Elektrokimia Elektroda Superkapasitor dari Limbah Daun Akasia (*Acacia mangium Wild*), *Komunikasi Fisika Indonesia (KFI)*, Vol.16, No.2:81-86.

Novitra, R., 2021, *Superkapasitor Berbahan Dasar Karbon Aktif dari Ampas Biji Kopi Robusta dengan Aktivator NaOH,* Tesis, Program Studi Magister Kimia, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Andalas, Padang.

Palisoc, S., Dungo, J. M., dan Natividad, M., 2020, Low-cost supercapacitor based on multi-walled carbon nanotubes and activated carbon derived from *Moringa oleifera* fruit shells, *Heliyon* 6: e03202.

Pradana, H.Y., 2017, *Sintesis rGO/Glukosa Dengan Variasi Perbandingan Massa dan Proses Eksfoliasi Secara Kimia Untuk Bahan Elektroda Superkapasitor*. Disertasi, jurusan Fisika, Fakultas MIPA, Institut Teknologi Sepuluh November, Surabaya.

Putri, N.D., 2021, *Kinerja Karbon Aktif Sabut Kelapa sebagai Elektroda Kapasitor Lapis Rangkap Listrik,* Skripsi, Jurusan Kimia, Fakultas Matematika Dan Ilmu Pengetahuan Alam, Universitas Andalas, Padang.

Ragland, K. W. dan Bryden K. M., 2011, *Combustion Engineering*, CRC Press, Amerika Serikat.

Raj, T. N. V., Hoskeri, P. A., Hamzad, S., Anatha, M. S., Joseph, C. M., Muralidhara, H. B., Kumar, K. Y., Alharti, F. A., Jeon, B. dan Raghu M. S., 2022, Moringa Oleifera leaf extract mediated synthesis of reduced graphene oxide-vanadium pentoxide nanocomposite for enhanced specific capacitance in supercapacitors, *Inorganic Chemistry Communications*, 142.

Reza, M., Ernawati, L., Pusfitasari, M. D., Sylvia, N., Noor, A. H., dan Ali L. G., 2022, Karakterisasi Karbon Aktif dari Kulit Pisang Kepok sebagai Superkapasitor, *Jurnal Teknik Kimia* 16(**2**): 53-60.

Rohmah, P. M. dan Redjeki, A. S., Pengaruh Waktu Karbonisasi pada Pembuatan Karbon Aktif berbahan baku sekam padi dengan aktivator KOH, *KONVERSI* 3(**1**): 19-27.

Skoog, D. A., Holler, F. J., dan Crouch, S. R., 2016, Principles of Instrumental Analysis, Cengage Learning: USA.

Taer, E., Apriwandi, A., Dalimunthea, B. K. L., dan Taslim, R., 2021(A), A rod-like mesoporous carbon derived from agro-industrial cassava petiole waste for supercapacitor application, *Journal of Chemical Technology and Biotechnology* 96(**3**):662-67.

Taer, E., Tsalis, Apriwandi, A., Yanti, N., Awitdrus, Lazuardi, dan Taslim, R, 2021(B), Porous Activated Carbon Binder-free Scleria sumatrensis StemBased for Supercapacitor Application, *Journal of Physics: Conference Series*, 2049, 012008.

Taer, E., Apriwandi, A., Taslim, R., Malik, dan Usman, 2019, Single stepcarbonization-activation of durian shells for producingactivated carbon monolith electrodes, *Int J Electrochem Sci* 14: 1318–1330.

Taslim, R., Apriwandi, A, dan Taer, E., 2022, Novel Moringa oleifera Leaves 3D Porous Carbon-Based Electrode Material as a High-Performance EDLC Supercapacitor, *American Chemical Society* 7(**41**): 36489–36502.

Yun, C. H., Park, Y. H., da Park, C. R., 2001, Effects of Pre-Carbonization on Porosity Development of Activated Carbons from Rice Straw, *Carbon* 39: 559-567.

Zhang, Y., Yu, P., Zheng, M., Xiao, Y., Hu, H., Liang, Y., Liu, Y., dan Dong, H., 2021, KCl-assisted activation: *Moringa oleifera* branch-derived porous carbon for high performance supercapacitor, *New J. Chem.* 45: 5712

LAMPIRAN

Lampiran 1 Bagan Kerja

1. Preparasi Sampel

3 kg biji kelor kering

- Dipisahkan dari kulitnya
- Diambil kulit biji kelor kering

400 g kulit biji kelor kering

- Diambil sebanyak 40 g
- Dibersihkan dengan akuades
- Dilakukan proses pra-karbonisasi dalam oven selama 1 jam dengan temperatur 2 x 125°C
- Ditimbang massa setelah pra-karbonisasi
- Dicatat perubahan yang terjadi

Sampel kulit biji kelor

2. Penggilingan Sampel

Sampel kulit biji kelor

- Dihaluskan menggunakan *blender*
- Diayak menggunakan ayakan 100 *mesh*
- Digiling menggunakan *ballmilling* selama ±24 jam
- Diayak menggunakan 200 mesh

Bubuk kulit biji kelor

3. Aktivasi Kimia
   a. Pembuatan KOH 0,3M

2,52 g KOH

- Dimasukkan ke dalam gelas kimia
- Dilarutkan ke dalam 150 mL akuades
- Dihomogenkan selama 1 jam dengan *magnetic stirrer*

KOH 0,3 M

b. Aktivasi Kimia

KOH 0,3M

- Ditambahkan 30 g bubuk biji kelor secara perlahan
- Dihomogenkan pada suhu tetap selama 2 jam
- Didiamkan hingga mencapai suhu ruang
- Dinetralkan hingga pH 7
- Dikeringkan dalam oven dengan temperatur 75°C hingga 90°C selama 24 jam
- Dihaluskan dengan mortar
- Diayak dengan 200 mesh

Sampel sesudah aktivasi

4. Karakterisasi Sampel

a. Analisis TG/DTG

Bubuk kulit biji kelor

- Diambil sebanyak 5 g untuk karakterisasi sampel
- Ditimbang sebanyak 0,025 g
- Dimasukkan ke dalam instrument TG/DTG
- Dialiri gas N_2 dengan laju peningkatan suhu sebesar 10°C per menit
- Diamati hasil analisis pada layar komputer

Data Analisis TG/DTG

b. Analisis FTIR

Bubuk kulit biji kelor

- Diambil sebanyak 5 g untuk karakterisasi sampel
- Ditimbang sebanyak 0,002 g
- Ditambahkan 0,198 g KBr
- Dicetak membentuk pelet
- Dimasukkan ke dalam instrument FTIR
- Diamati hasil analisis

Data Analisis FTIR

Catatan: Dilakukan prosedur yang sama terhadap sampel setelah aktivasi.

c. Analisis XRD

Bubuk kulit biji kelor

- Diambil sebanyak 5 g untuk karakterisasi sampel
- Ditimbang sebanyak 2 g
- Dipasang pada instrumen XRD yang telah
- Dipasangkan kolimator
- Ditutup instrumen XRD
- Diamati hasil analisis pada layar komputer

Data Analisis XRD

d. Analisis Massa Jenis

Pelet Elektroda Karbon

- Diukur diameter menggunakan jangka sorong
- Diukur ketebalan menggunakan mikrometer sekrup
- Ditimbang massa elektroda karbon
- Dihitung volume elektroda karbon
- Dihitung massa jenis elektroda karbon
- Dicatat massa jenis elektroda karbon

Massa jenis elektroda karbon

5. Pembuatan Pelet Elektroda Karbon

Sampel sesudah aktivasi

- Ditimbang sebanyak 0,7 g
- Dicetak menjadi pelet menggunakan *hydraulic press* pada tekanan 10 ton
- Ditahan selama 5 menit

Pelet Elektroda Karbon

Lampiran 2 Perhitungan

1. Pembuatan KOH 0,3M

$$\text{Massa KOH} = \frac{\text{M KOH} \times \text{V akuades} \times \text{Mr KOH}}{1000}$$

$$\text{Massa KOH} = \frac{0{,}3\ \text{M} \times 150\ \text{ml} \times 56\ \text{g/mol}}{1000}$$

$$\text{Massa KOH} = 2{,}52\ \text{g}$$

2. Perhitungan Massa Jenis
   a. Elektroda Karbon A
      i. Diameter rata-rata elektroda karbon A

$$\overline{D_A} = \frac{\sum D_A}{n}$$

$$\overline{D_A} = \frac{490{,}8}{25}$$

$$\overline{D_A} = 20{,}45\ \text{mm}$$
$$\overline{D_A} = 2{,}045\ \text{cm}$$

      ii. Tebal rata-rata elektroda karbon A

$$\overline{T_A} = \frac{\sum T_A}{n}$$

$$\overline{T_A} = \frac{61{,}74}{25}$$

$$\overline{T_A} = 2{,}47\ \text{mm}$$
$$\overline{T_A} = 0{,}247\ \text{cm}$$

      iii. Massa rata-rata elektroda karbon A

$$\overline{M_A} = \frac{\sum M_A}{n}$$

$$\overline{M_A} = \frac{17{,}668}{25}$$

$$\overline{M_A} = 0{,}71\ \text{gram}$$

      iv. Massa jenis rata-rata elektroda karbon A

$$\rho = \frac{4 \times \overline{M_A}}{\pi \overline{D_A}^2 t}$$

$$\bar{x} = \frac{2{,}84}{3{,}243} = 0{,}876\ \text{g/cm}^3 = 0{,}88\ \text{g/cm}^3$$

b. Elektroda Karbon B

i. Diameter rata-rata elektroda karbon B

$$\overline{D_B} = \frac{\sum D_B}{n}$$

$$\overline{D_B} = \frac{489,09}{25}$$

$$\overline{D_B} = 20,38 \text{ mm}$$
$$\overline{D_B} = 2,038 \text{ cm}$$

ii. Tebal rata-rata elektroda karbon B

$$\overline{T_B} = \frac{\sum T_B}{n}$$

$$\overline{T_B} = \frac{59,94}{25}$$

$$\overline{T_B} = 2,40 \text{ mm}$$
$$\overline{T_B} = 0,240 \text{ cm}$$

iii. Massa rata-rata elektroda karbon B

$$\overline{M_B} = \frac{\sum M_B}{n}$$

$$\overline{M_B} = \frac{17,70}{25}$$

$$\overline{M_B} = 0,71 \text{ gram}$$

iv. Massa jenis rata-rata elektroda karbon B

$$\rho = \frac{4 \times \overline{M_B}}{\pi \overline{D_B}^2 t}$$

$$\bar{x} = \frac{2,84}{3,127} = 0,908 \text{ g/cm}^3 = 0,91 \text{ g/cm}^3$$

c. Elektroda Karbon C

i. Diameter rata-rata elektroda karbon C

$$\overline{D_C} = \frac{\sum D_C}{n}$$

$$\overline{D_C} = \frac{507,89}{25}$$

$$\overline{D_C} = 20,32 \text{ mm}$$
$$\overline{D_C} = 2,032 \text{ cm}$$

ii. Tebal rata-rata elektroda karbon C

$$\overline{T_C} = \frac{\sum T_C}{n}$$

$$\overline{T_C} = \frac{55,81}{25}$$

$$\overline{T_C} = 2,33 \text{ mm}$$

$$\overline{T_C} = 0,233 \text{ cm}$$

iii. Massa rata-rata elektroda karbon C

$$\overline{M_C} = \frac{\sum M_C}{n}$$

$$\overline{M_C} = \frac{17,66}{25}$$

$$\overline{M_C} = 0,71 \text{ gram}$$

iv. Massa jenis rata-rata elektroda karbon C

$$\rho = \frac{4 \times \overline{M_C}}{\pi \overline{D_C}^2 t}$$

$$\bar{x} = \frac{2,84}{3,014} = 0,942 \text{ g/cm}^3 = 0,94 \text{ g/cm}^3$$

Lampiran 3 Dokumentasi Penelitian

Bubuk Kulit Biji Kelor

Aktivasi dengan KOH 0,3 M

Pengeringan Sampel

Penggerusan Sampel

Pengayakan Sampel

Pencetakan Elektroda Karbon

Lampiran 4 Elektroda Karbon

Elektroda Karbon A

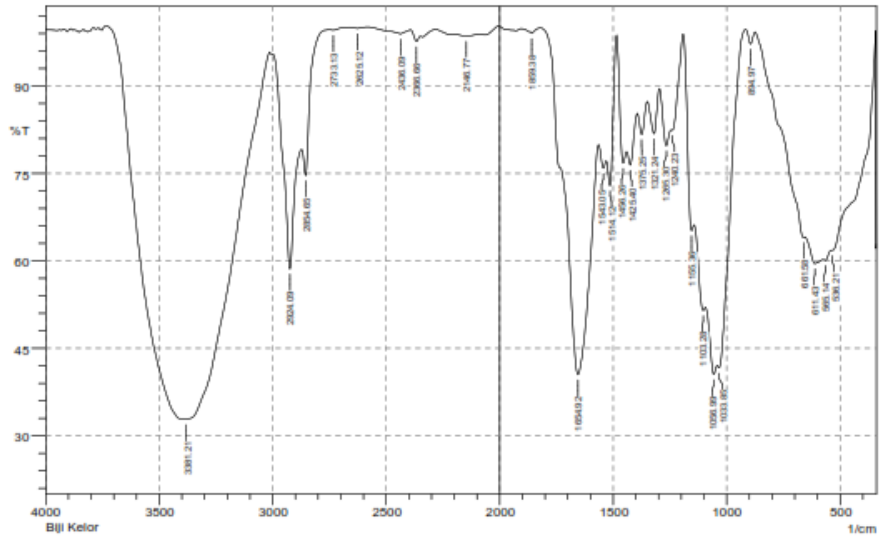
Elektroda Karbon B

Elektroda Karbon C

Lampiran 5 Hasil Analisis FTIR

1. Analisis FTIR sebelum aktivasi

SHIMADZU



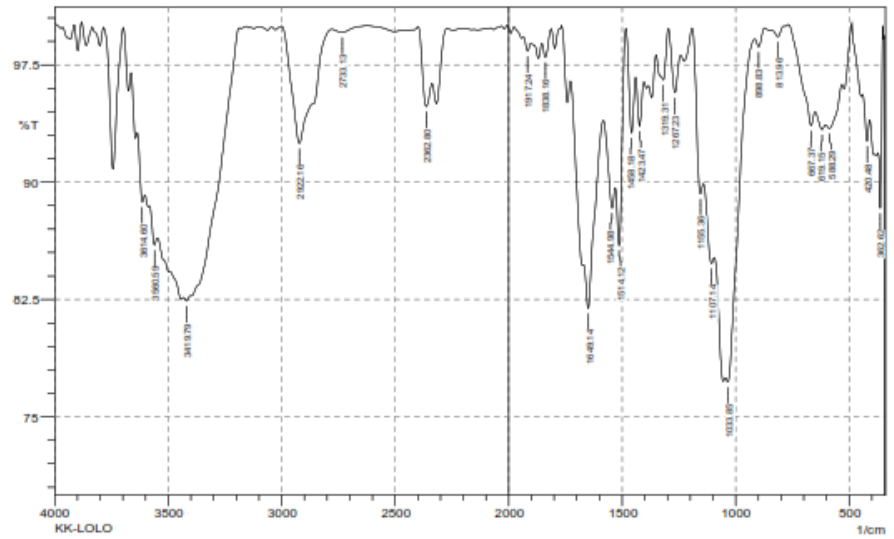
No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	536.21	61.797	0.362	536.14	345.26	27.162	6.347
2	565.14	60.097	0.53	574.79	536.14	7.913	0.064
3	611.43	59.536	2.413	653.87	576.72	16.633	0.651
4	661.58	64.021	1.004	673.75	655.8	19.696	0.135
5	694.97	97.192	2.256	916.19	673.75	0.295	0.193
6	1033.85	41.654	3.952	1041.56	916.12	20.062	0.862
7	1056.99	40.534	4.266	1091.71	1043.49	16.931	0.93
8	1103.26	51.491	3.322	1141.66	1093.64	11.991	0.739
9	1155.36	65.19	6.613	1192.01	1143.79	5.569	1.109
10	1240.23	82.409	1.276	1244.09	1193.94	2.56	0.397
11	1265.3	79.772	5.383	1296.16	1246.02	4.076	0.735
12	1321.24	81.622	6.626	1345.24	1295.09	3.576	0.892
13	1375.25	81.695	4.396	1392.61	1350.17	3.203	0.492
14	1425.4	76.444	4.462	1440.63	1394.53	4.52	0.551
15	1456.26	76.791	5.209	1465.19	1442.75	3.405	0.962
16	1514.12	72.697	11.923	1529.55	1467.12	3.605	1.356
17	1543.05	75.696	2.212	1564.27	1531.45	3.671	0.211
18	1654.92	40.491	46.4	1815.67	1566.2	44.547	32.221
19	1859.36	99.031	0.357	1867.09	1820.6	0.096	0.018
20	2146.77	96.556	0.334	2206.57	2066.96	0.672	0.092
21	2366.66	97.627	1.323	2393.66	2349.3	0.299	0.115
22	2436.09	96.921	0.607	2562.66	2393.66	0.415	0.299
23	2625.12	99.652	0.224	2663.69	2562.66	0.004	0.031
24	2733.13	99.574	0.166	2752.42	2663.69	0.07	0.015
25	2854.65	74.666	7.625	2872.01	2767.85	4.45	0.704
26	2924.09	56.643	26.991	2999.31	2873.94	15.067	7.375
27	3361.21	32.622	65.263	3726.4	3014.74	185.424	179.139

Comment;
Biji Kelor

Date/Time; 11/17/2023 1:36:09 PM
No. of Scans;
Resolution;
Apodization;

2. Analisis FTIR sesudah aktivasi

SHIMADZU

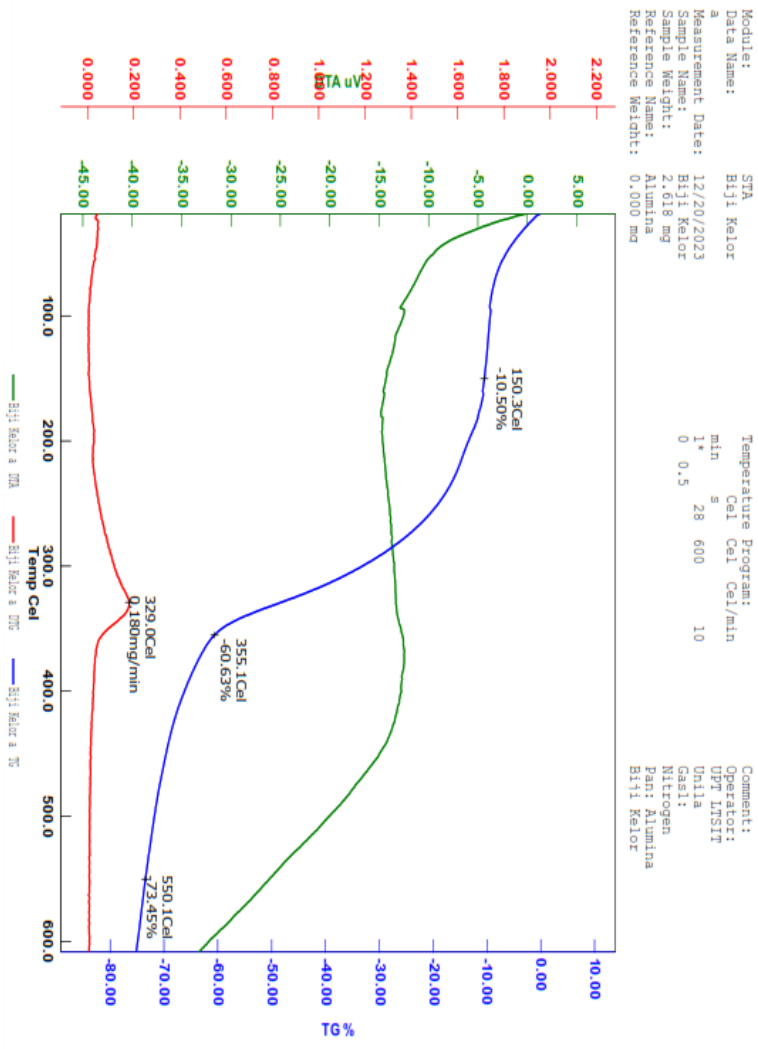


No.	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area
1	362.62	86.339	7.217	372.26	351.04	0.717	0.325
2	420.48	92.631	1.941	439.77	406.91	0.656	0.136
3	586.29	93.435	0.789	603.72	532.35	1.619	0.223
4	619.15	93.356	0.56	646.66	605.65	1.194	0.063
5	667.37	93.606	1.707	767.67	650.01	1.772	0.339
6	813.96	99.291	0.645	871.62	786.96	0.13	0.099
7	886.83	96.646	0.771	916.19	871.62	0.167	0.07
8	1033.65	77.229	1.925	1043.49	916.12	6.375	0.276
9	1107.14	84.612	1.536	1141.66	1095.57	2.69	0.19
10	1155.36	89.264	3.009	1192.01	1143.79	1.49	0.345
11	1267.23	95.724	3.16	1296.16	1242.16	0.625	0.36
12	1319.31	96.535	1.256	1330.66	1296.16	0.359	0.096
13	1423.47	93.593	2.953	1440.83	1404.16	0.602	0.242
14	1456.16	93.146	4.615	1463.26	1440.83	0.766	0.457
15	1514.12	85.972	7.179	1529.55	1465.19	1.764	0.736
16	1544.96	86.347	2.405	1563.56	1531.46	2.222	0.267
17	1649.14	81.945	4.692	1666.43	1565.49	4.666	0.5
18	1836.16	97.986	1.226	1853.59	1813.09	0.231	0.112
19	1917.24	96.379	0.689	1934.6	1901.81	0.179	0.046
20	2362.8	94.836	2.946	2399.45	2337.72	0.926	0.414
21	2733.13	99.583	0.256	2781.35	2625.12	0.147	0.066
22	2922.16	92.473	7.429	2999.31	2781.35	3.555	3.434
23	3419.79	82.414	0.253	3431.36	3402.43	2.406	0.019
24	3560.59	85.99	1.155	3581.81	3549.02	2.016	0.096
25	3614.6	86.741	1.654	3635.82	3604.96	1.395	0.133

Comment;
KK-LOLO

Date/Time; 3/6/2024 7:26:45 PM
No. of Scans;
Resolution;
Apodization;

Lampiran 6 Analisis TG/DTG



Lampiran 7 Analisis XRD

1. Hasil Analisis XRD Sebelum Aktivasi

*** Basic Data Process ***

Group : Standard
Data : xrd#biji#kelor

Strongest 3 peaks

no. peak no.	2Theta (deg)	d (A)	I/I1	FWHM (deg)	Intensity (Counts)	Integrated Int (Counts)
1 37	44.0524	2.05397	100	0.15940	506	4529
2 41	64.4175	1.44520	99	0.17620	502	4700
3 32	37.8271	2.37643	13	0.18570	66	554

Peak Data List

peak no.	2Theta (deg)	d (A)	I/I1	FWHM (deg)	Intensity (Counts)	Integrated Int (Counts)
1	15.4939	5.71447	3	0.04120	16	61
2	16.4312	5.39054	4	0.12250	20	196
3	16.7052	5.30274	4	0.13620	19	122
4	16.9575	5.22441	3	0.15500	16	148
5	17.3716	5.10079	3	0.09670	17	107
6	19.1505	4.63080	3	0.05230	15	60
7	20.0329	4.42877	4	0.07920	20	129
8	20.3800	4.35412	4	0.09340	18	115
9	20.6100	4.30604	6	0.20000	32	378
10	21.0600	4.21504	6	0.18000	28	368
11	21.2400	4.17972	8	0.13720	40	280
12	21.5400	4.12218	9	0.23420	44	1003
13	21.8800	4.05889	11	0.00000	56	0
14	22.2200	3.99755	11	0.00000	54	0
15	22.4000	3.96583	10	0.16000	50	762
16	22.6000	3.93118	8	0.00000	43	0
17	22.7200	3.91069	7	0.25000	34	414
18	22.9883	3.86565	6	0.18330	29	260
19	23.1986	3.83108	5	0.17730	27	226
20	23.5886	3.76862	5	0.11070	24	216
21	24.1116	3.68804	5	0.08330	23	171
22	24.2850	3.66210	9	0.09450	44	236
23	29.0722	3.06905	3	0.09560	16	87
24	29.6550	3.01005	3	0.27000	15	227
25	29.9083	2.98513	3	0.12330	17	134
26	33.0683	2.70673	3	0.07670	15	126
27	33.6773	2.65916	4	0.10130	19	113
28	33.8878	2.64313	3	0.06440	15	80
29	34.3585	2.60799	3	0.07710	16	119
30	36.8483	2.43728	3	0.08330	16	120
31	37.6400	2.38782	4	0.08000	19	107
32	37.8271	2.37643	13	0.18570	66	554
33	38.0000	2.36602	7	0.09500	33	210
34	39.4916	2.28002	4	0.09670	20	137
35	40.3493	2.23351	3	0.11470	15	152
36	40.6483	2.21777	3	0.19000	15	145
37	44.0524	2.05397	100	0.15940	506	4529
38	44.2800	2.04394	7	0.07700	33	245
39	46.7815	1.94030	3	0.09300	15	115
40	64.0800	1.45200	4	0.12000	20	321
41	64.4175	1.44520	99	0.17620	502	4700
42	64.7200	1.43917	5	0.14660	26	271

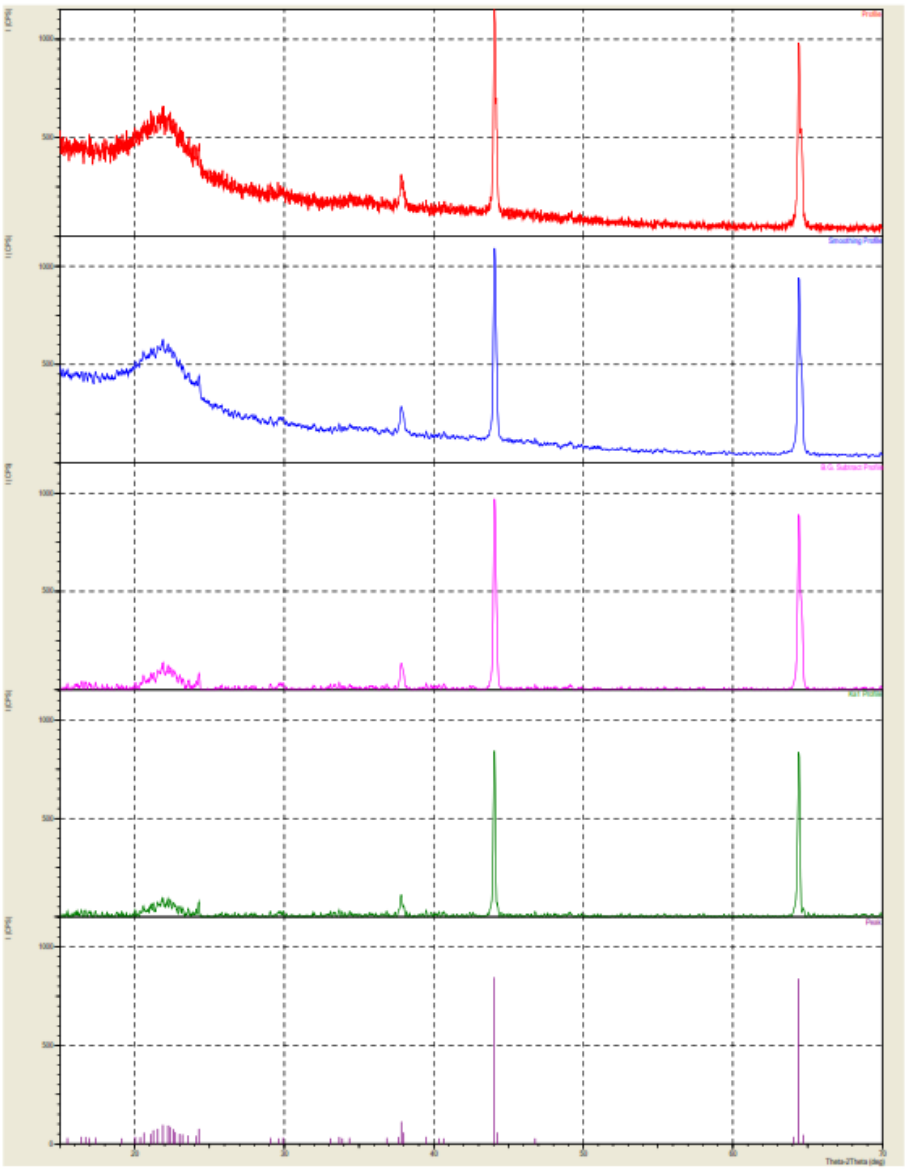
```
        ***  Basic Data Process  ***

# Data Infomation
          Group               : Standard
          Data                : xrd#biji#kelor
          Sample Nmae         : powder
          Comment             :
          Date & Time         : 11-15-23 13:28:37

# Measurement Condition
    X-ray tube
          target              : Cu
          voltage             : 40.0 (kV)
          current             : 30.0 (mA)
    Slits
          Auto Slit           : not Used
          divergence slit     :   1.00000 (deg)
          scatter slit        :   1.00000 (deg)
          receiving slit      :   0.30000(mm)
    Scanning
          drive axis          : Theta-2Theta
          scan range          :   15.0000 - 70.0000 (deg)
          scan mode           : Continuous Scan
          scan speed          :    2.0000 (deg/min)
          sampling pitch      :    0.0200 (deg)
          preset time         :    0.60 (sec)

# Data Process Condition
    Smoothing                 [ AUTO ]
          smoothing points    : 11
    B.G.Subtruction           [ AUTO ]
          sampling points     : 13
          repeat times        : 30
    Kal-a2 Separate           [ MANUAL ]
          Kal a2 ratio        : 50 (%)
    Peak Search               [ AUTO ]
          differential points : 9
          FWHM threhold       : 0.050 (deg)
          intensity threhold  : 30 (par mil)
          FWHM ratio  (n-1)/n : 2
    System error Correction   [ NO ]
    Precise peak Correction   [ NO ]
```

< Group: Standard Data: xrd#biji#kelor >



2. Hasil Analisis XRD Sesudah Aktivasi

*** Basic Data Process ***

Group : Standard
Data : KK#LOLO

Strongest 3 peaks

no.	peak no.	2Theta (deg)	d (A)	I/I1	FWHM (deg)	Intensity (Counts)	Integrated Int (Counts)
1	30	44.0457	2.05426	100	0.16670	500	4541
2	33	64.4089	1.44537	96	0.18510	482	4840
3	17	22.2400	3.99400	14	0.00000	70	0

Peak Data List

peak no.	2Theta (deg)	d (A)	I/I1	FWHM (deg)	Intensity (Counts)	Integrated Int (Counts)
1	15.1306	5.85085	3	0.16530	16	179
2	15.7750	5.61327	3	0.07000	17	119
3	16.2100	5.46360	3	0.06000	17	74
4	16.4933	5.37039	3	0.14670	17	150
5	16.7358	5.29311	3	0.09830	16	80
6	16.8933	5.24412	4	0.09330	18	158
7	18.2787	4.84965	3	0.03750	15	40
8	19.0067	4.66551	3	0.08000	17	138
9	20.1833	4.39611	4	0.15330	20	271
10	20.3800	4.35412	3	0.08000	17	91
11	20.6100	4.30604	4	0.18000	20	348
12	20.9600	4.23492	3	0.00000	17	0
13	21.1544	4.19644	7	0.15120	37	326
14	21.3943	4.14993	10	0.25140	48	515
15	21.7800	4.07730	11	0.47120	54	1157
16	22.0200	4.03340	12	0.00000	58	0
17	22.2400	3.99400	14	0.00000	70	0
18	22.4200	3.96234	14	0.00000	68	0
19	22.6600	3.92091	10	0.00000	51	0
20	22.8000	3.89715	11	0.00000	56	0
21	23.0000	3.86371	8	0.60000	39	844
22	23.3200	3.81141	5	0.12000	27	166
23	23.5541	3.77406	5	0.08830	27	158
24	23.8950	3.72098	4	0.09660	18	203
25	34.6585	2.58609	4	0.12290	19	220
26	37.5225	2.39502	3	0.09500	17	97
27	37.7926	2.37852	13	0.20680	67	657
28	38.0000	2.36602	5	0.06220	23	123
29	43.7200	2.06881	3	0.06000	17	117
30	44.0457	2.05426	100	0.16670	500	4541
31	44.2800	2.04394	7	0.07200	33	190
32	64.0000	1.45362	3	0.20000	17	368
33	64.4089	1.44537	96	0.18510	482	4840
34	64.7450	1.43868	5	0.13000	26	176

```
         ***  Basic Data Process  ***

# Data Infomation
          Group               : Standard
          Data                : KK#LOLO
          Sample Nmae         : serbuk
          Comment             :
          Date & Time         : 03-08-24 09:57:01

# Measurement Condition
    X-ray tube
          target              : Cu
          voltage             : 40.0 (kV)
          current             : 30.0 (mA)
    Slits
          Auto Slit           : Used
          divergence slit     :   1.00000 (deg)
          scatter slit        :   1.00000 (deg)
          receiving slit      :   0.30000(mm)
    Scanning
          drive axis          : Theta-2Theta
          scan range          :   15.0000 - 70.0000 (deg)
          scan mode           : Continuous Scan
          scan speed          :    2.0000 (deg/min)
          sampling pitch      :    0.0200 (deg)
          preset time         :    0.60 (sec)

# Data Process Condition
    Smoothing                 [ AUTO ]
          smoothing points    : 11
    B.G.Subtruction           [ AUTO ]
          sampling points     : 13
          repeat times        : 30
    Kal-a2 Separate           [ MANUAL ]
          Kal a2 ratio        : 50 (%)
    Peak Search               [ AUTO ]
          differential points : 9
          FWHM threhold       : 0.050 (deg)
          intensity threhold  : 30 (par mil)
          FWHM ratio  (n-1)/n : 2
    System error Correction   [ NO ]
    Precise peak Correction   [ NO ]
```

< Group: Standard Data: KK#LOLO >