LAMPIRAN 1. Hasil pengukuran minyak trafo menggunakan FTIR

a. Hasil pengukuran pembanding minyak trafo murni

Tabel 2. Hasil pengukuran FTIR pembanding minyak trafo

Sampel	Daerah Serapan (cm^{-1})	Jenis Ikatan
Minyak Pembanding	2953,57	Regang –CH3, -CH2-, C-H, C-H aldehid
	2852,53	Regang –CH3, -CH2-, C-H, C-H aldehid
	1462,07	Cincin Aromatik

b. Hasil pengukuran limbah minyak trafo

Tabel 3. Hasil pengukuran FTIR limbah minyak trafo

Sampel	Daerah Serapan (cm^{-1})	Jenis Ikatan
Limbah Minyak Trafo	3948,81	-
	3942,77	-
	3952,83	-
	3801,70	-
	3796,71	-
	3689,65	Regang O-H, N-H
	3675,82	
	3670,17	
	3656,53	
	3649,35	
	3629,14	
	3619,16	
	3613,18	
	3595,18	
	3587,60	
	3566,94	
	3545,83	
	3527,55	
	3503,03	
	2957,51	Regang –CH3, -CH2-, C-H, C-H aldehid
	2870,42	
	1750,05	Regang C=O (asam, aldehid, keton, amida, ester, anhidrida)
	1734,23	
	1717,41	
	1705,65	

	1696,52	
	1684,44	
	1670,10	
	1772,50	
	1700,55	
	1653,59	
	1647,11	Regang C=C (aromatik dan alifatik), C=N
	1636,24	
	1540,85	
	1533,62	
	1521,69	
	1517,03	
	1507,25	
	1559,10	
	1497,56	
	1489,54	
	1472,98	
	1465,13	
	1457,51	

LAMPIRAN 2. Hasil pengukuran minyak trafo menggunakan GC-MS

a. Hasil pengukuran pembanding minyak trafo murni

Tabel 4. Hasil pengukuran GC (*Gas Chromatography*) minyak trafo

No.	Waktu Retensi	%Area	A/H	Nama Senyawa
1	8.775	0.01	11.81	Cyclohexane, (2-ethyl-1-methyl-1-butenyl)-
2	9.006	0.01	5.34	1,1'-Bicyclohexyl
3	9.308	0.06	14.64	Naphthalene, 2-Butyldecahydro-
4	9.650	0.08	13.17	3,5-Octadiene, 4,5-Diethyl-3,6-Dimethyl-
5	9.755	0.08	7.50	1,1'-Bicyclohexyl, 2-methyl-, cis-
6	9.992	0.12	11.15	2,6A-Methano-6AH-Indeno[4,5-B]oxirene,octahydri-,(1A.Alpha.,2.
7	10.224	0.18	12.18	1-{4-Propylbicyclo[2.2.2]octan-1-yl}ethanone
8	10.453	0.25	12.66	1,1'-Bicyclohexyl, 4,4'-dimethyl-
9	10.600	0.21	7.59	1,1'-Bicyclohexyl, 4,4'-dimethyl-
10	10.739	0.27	7.14	1H-Indene, Octahydro-2,2,4,4,7,7-Hexamethyl-, Trans-
11	10.906	0.39	10.83	Phenanthrene, Tetradecahydro-
12	11.051	0.26	6.81	Cholest-22-ene-21-ol, 3,5-dehydro-6-methoxy-, pivalate
13	11.150	0.23	5.78	4,5-.Alpha.,.Alpha.-Eudesmane
14	11.279	0.62	10.85	1-(2-Hydroxyethyl)-1,2,5,5-tetramethyl-cis-decalin(1R,2S,4as,8as)
15	11.654	1.40	17.82	Tetradecahydroanthracene
16	11.967	1.42	17.44	Anthracene, Tetradecahydro-, (4A.Alpha.,8A.Alpha.,9A.Beta.,10A.
17	12.399	2.36	19.11	Tetradecahydro-1-methylphenanthrene

18	12.573	1.25	9.35	1H-3A,7-Methanoazulene, Octahydro-1,4,9,9-Tetramethyl-
19	12.694	1.16	8.83	Tetradecahydro-1-methylphenanthrene
20	13.168	4.13	25.08	Cyclohexane, 1,1'-(1,2-ethanediyl)bis-
21	13.467	3.91	21.86	OCTADECANE
22	13.961	4.98	25.42	HAHNFETT
23	14.176	4.17	20.72	Pentadecane, 2,6,10,14-tetramethyl-
24	14.533	1.49	7.95	Cyclohexane, 1,1'-(1,2-dimethyl-1,2-ethanediyl)bis-, (R*,R*)-(.+/-.)-
25	14.599	2.58	13.76	2-HEXADECENE, 2,6,10,14-TETRAMETHYL-
26	14.928	1.81	9.85	Naphthalene, 2-decyldecahydro-
27	15.123	3.27	17.55	1-Hexacosanol
28	15.367	2.27	12.79	1,1'-Bicyclohexyl, 4-methyl-4'-pentyl-
29	15.585	2.10	11.23	HEXADECANE, 2,6,10,14-TETRAMETHYL-
30	15.767	1.68	9.79	CEDRAN-8-OL
31	15.948	2.10	12.86	17-Pentatriacontene
32	16.150	2.36	14.30	1-Pentacosanol
33	16.483	2.00	12.32	1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester
34	16.596	0.90	5.96	HAHNFETT
35	16.796	2.41	15.64	1,1':3',1''-Tercyclopentane, 2'-dodecyl-
36	16.968	2.45	15.86	PENTATRIACONTANE
37	17.292	2.27	16.52	Tetrapentacontane, 1,54-dibromo-
38	17.521	0.38	2.99	Oxalic acid, cyclohexylmethyl tridecyl ester
39	17.567	0.51	3.98	1H-3A,7-METHANOAZULEN-6-OL, OCTAHYDRO-3,6,8,8-TETRAMETHYL-, [3R
40	17.679	1.02	7.93	(4aS,5S,8aS)-5-Isopentyl-1,1,4a-trimethyl-6-methylenedecahydronaphthalene

41	17.852	2.12	16.42	9-Hexacosene
42	18.067	1.39	11.69	HAHNFETT
43	18.336	1.59	13.51	1H-Benzocyclohepten-7-ol, 2,3,4,4a,5,6,7,8-octahydro-1,1,4a,7-tetramethyl-, cis-
44	18.467	1.29	11.72	Eicosyl heptafluorobutyrate
45	18.683	0.53	4.93	cis, cis-3-Ethylbicyclo[4.4.0]decane
46	18.878	1.59	14.53	14-.BETA.-H-PREGNA
47	19.033	0.80	7.87	cis, cis-2-Ethylbicyclo[4.4.0]decane
48	19.271	2.19	21.48	Androstane, (5.alpha.)-
49	19.568	1.07	10.78	Eicosyl heptafluorobutyrate
50	19.750	1.15	11.83	Hentriacontane
51	19.899	0.29	2.98	4,5-.ALPHA.,.ALPHA.-EUDESMANE
52	20.123	1.93	19.47	14-.BETA.-H-PREGNA
53	20.283	1.04	10.70	1,40-TETRACONTANEDIOL
54	20.496	1.00	10.80	cis-9-Hexadecenal
55	20.692	0.83	8.74	HAHNFETT
56	20.834	0.83	8.85	2,5-FURANDIONE, 3-(DODECENYL)DIHYDRO-
57	21.113	2.11	22.14	Octacosane
58	21.369	0.72	7.81	17-Pentatriacontene
59	21.514	0.70	7.92	Carbonic acid, decyl heptadecyl ester
60	21.617	1.03	11.79	Tetrapentacontane, 1,54-dibromo-
61	21.803	0.59	6.96	erythro-7,8-Bromochlorodisparlure
62	21.967	0.83	9.75	1-PENTACOSANOL
63	22.101	0.66	7.89	Tetracontane-1,40-diol
64	22.331	1.32	15.47	Nonahexacontanoic acid
65	22.534	1.42	17.04	14-.BETA.-H-PREGNA
66	22.821	0.75	9.78	Tetratriacontyl pentafluoropropionate
67	22.970	0.76	9.74	14-.BETA.-H-PREGNA
68	23.133	0.93	12.67	TETRAPENTACONTANE
69	23.381	2.47	34.80	2-Methylhexacosane
70	24.000	0.63	10.76	1,3,5-tris(cyclohexyl)pent-1-ene
71	24.194	0.66	11.47	1-BROMOTRIACONTANE
72	24.417	0.57	10.72	1,22-Docosanediol
73	24.566	1.10	20.59	14-.BETA.-H-PREGNA

74	24.959	1.05	24.28	Heptacosyl heptafluorobutyrate
75	25.350	0.76	22.64	TETRADECANE, 3-METHYL-
76	25.817	0.21	7.71	HAHNFETT
77	25.950	0.21	8.66	2-Methylhexacosane
78	26.139	0.63	26.70	TETRAPENTACONTANE
79	26.629	0.52	30.68	Pentatriacontane
80	27.333	0.08	9.15	HEXADECANE, 3-METHYL-
81	27.467	0.06	7.30	1-Cyclopentyleicosane
82	27.650	0.04	6.15	Eicosane, 2-cyclohexyl-
83	27.817	0.07	12.02	14-.BETA.-H-PREGNA
84	27.967	0.03	5.48	Eicosane
85	28.100	0.06	14.81	DOTRIACONTANE
86	28.478	0.04	10.68	TETRACONTANE
87	28.900	0.02	7.55	Heptadecane, 4-propyl-
88	28.900	0.01	6.79	2-Methyltetracosane
89	29.515	0.02	7.28	Tridecane, 5-cyclohexyl-
90	29.750	0.00	4.01	Tetratetracontane
91	30.221	0.02	4.88	1,2-BENZENEDICARBOXYLIC ACID, DITRIDECYL ESTER
92	30.500	0.01	9.09	1H-INDOLIZINO[8,1-CD]CARBAZOLE, VINCALEUKOBLASTINE DERIV.
93	31.285	0.01	6.30	(1-BUTYLOCTYL)CYCLOHEXANE
94	31.483	0.00	7.03	Behenyl chloride
95	31.888	0.02	7.79	TRIACONTANE
96	32.183	0.01	8.49	Dotriacontane
97	33.471	0.02	7.49	TETRACONTANE
98	34.981	0.02	8.55	PENTATRIACONTANE
99	36.541	0.01	5.88	2-Methylhexacosane
100	39.192	0.01	6.59	28-Nor-17.alpha.(H)-hopane

b. Hasil pengukuran limbah minyak trafo murni

Tabel 5. Hasil pengukuran GC (*Gas Cromatography*) limbah minyak trafo

No.	Waktu Retensi	%Area	A/H	Nama Senyawa

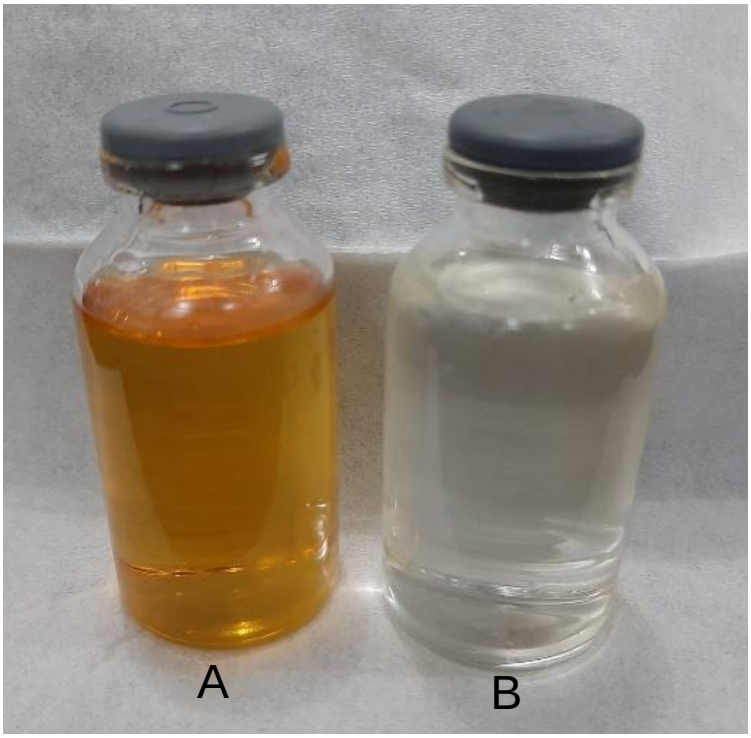
1	8.758	0,03	9.45	1-CHLOROOCTADECANE
2	9.142	0.09	18.79	2,3a-Dimethylhexahydrobenzofuran
3	9.547	0.17	14.35	8-Hexadecyne
4	9.766	0.19	12.04	Heptane, 1,1-dicyclohexyl-
5	10.064	0.26	12.07	Cyclohexane, 1,1,3-trimethyl-2-(3-methylpentyl)-
6	10.192	0.21	7.83	1-Decanol, 2-hexyl-
7	10.375	0.33	12.11	NAPHTHALENE, DECAHYDRO-1,6-DIMETHYL-
8	10.608	0.29	8.06	Cyclohexane, 1,1'-propylidenebis-
9	10.740	0.34	7.61	1H-INDENE, OCTAHYDRO-2,2,4,4,7,7-HEXAMETHYL-, TRANS-
10	11.008	1.09	23.31	2,6,10-Trimethyltridecane
11	11.274	0.51	7.45	Oleyl alcohol, trifluoroacetate
12	11.438	0.48	7.13	Decahydro-1,1,4a,5,6-pentamethylnaphthalene
13	11.566	0.95	13.11	14-.BETA.-H-PREGNA
14	11.789	0.65	8.31	1,3-Dioxolane, 4-ethyl-5-octyl-2,2-bis(trifluoromethyl)-, trans-
15	11.937	0.72	9.65	HAHNFETT
16	12.376	2.06	18.12	14-.BETA.-H-PREGNA
17	12.544	1.01	8.72	(2,4,6-Trimethylcyclohexyl) methanol
18	12.845	1.83	15.00	Carbonic acid, octadecyl vinyl ester
19	13.092	1.84	14.08	Cyclohexane, 1,2,3,5-tetraisopropyl-
20	13.207	0.77	5.95	4-FLUOROPHENYL 4-(4-PROPYLCYCLOHEXYL)CYCLOHEXANECARBOXYL
21	13.426	2.35	15.46	2,6,10-TRIMETHYLPENTADECANE
22	13.895	4.52	25.31	Oleyl alcohol, chlorodifluoroacetate
23	14.114	2.04	9.73	Pentadecane, 2,6,10,14-tetramethyl-
24	14.216	1.45	7.92	CYCLOHEXANONE, 3-METHYL-2-(1-METHYLETHYL)-, CIS-

25	14.397	1.81	9.89	BORINIC ACID, DIETHYL-, (2-ETHYL-1,3,2-DIOXABORINAN-4-YL)METHYL E
26	14.562	2.24	11.51	1-DODECANOL, 3,7,11-TRIMETHYL-
27	14.796	2.60	12.94	1H-INDENE, 2-BUTYL-5-HEXYLOCTAHYDRO-
28	15.098	3.17	16.55	Oxirane, 2-decyl-3-(5-methylhexyl)-, cis-(.+/-.)-
29	15.358	3.02	15.63	1H-INDENE, 2-BUTYL-5-HEXYLOCTAHYDRO-
30	15.508	1.54	7.30	HEXADECANE, 2,6,10,14-TETRAMETHYL-
31	15.702	2.12	11.61	1H-Indene, 2-butyl-5-hexyloctahydro-
32	15.852	2.04	11.75	(2-Isopropyl-5,5-dimethyl-cyclohexyl)-[1,2,4]triazol-1-yl-methanone
33	16.128	3.54	20.05	Acetic acid, 3,7,11,15-tetramethyl-hexadecyl ester
34	16.441	1.94	9.02	1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester
35	16.588	1.46	8.90	1-(2-Hydroxyethyl)-1,2,5,5-tetramethyl-cis-decalin(1R,2S,4as,8as)
36	16.752	1.45	8.78	10-Methyl-Z-11-tridecen-1-ol acetate
37	16.858	1.54	9.63	Eicosane
38	17.092	1.45	9.78	NONADECANE
39	17.208	1.00	6.91	Cyclohexane, 1,2,3,5-tetraisopropyl-
40	17.336	2.09	13.70	(4aS,5S,8aS)-5-Isopentyl-1,1,4a-trimethyl-6-methylenedecahydronaphthalene
41	17.595	1.06	7.82	(4aS,5S,8aS)-5-Isopentyl-1,1,4a-trimethyl-6-methylenedecahydronaphthalene
42	17.742	3.41	24.38	Henicos-1-ene
43	18.244	3.79	29.54	HAHNFETT
44	18.708	0.42	3.93	9-Octadecenoic acid (Z)-, 9-octadecenyl ester, (Z)-

45	18.758	1.49	14.33	Androstane, (5.beta.)-
46	19.075	0.85	8.77	Docosanoic acid, ethyl ester
47	19.221	1.63	16.15	14-.BETA.-H-PREGNA
48	19.514	1.10	11.75	HAHNFETT
49	19.675	0.72	7.93	Androstane, (5.beta.)-
50	20.012	1.96	19.65	03027205002 FLAVONE 4'-OH,5-OH,7-DI-O-GLUCOSIDE
51	20.258	1.42	15.82	HAHNFETT
52	20.427	0.42	4.83	HAHNFETT
53	20.586	1.13	12.02	15-Isobutyl-(13.alpha.H)-isocopalane
54	20.801	0.93	10.69	14-.BETA.-H-PREGNA
55	20.995	1.32	15.23	2-Methylhexacosane
56	20.995	0.40	4.97	Cyclohexane, 1,1'-(2-tridecyl-1,3-propanediyl)bis-
57	21.292	0.72	8.80	Cyclohexane, 1,1'-(2-tridecyl-1,3-propanediyl)bis-
58	21.443	1.04	10.48	Squalane
59	21.659	1.67	20.56	Heneicosane
60	22.079	1.12	14.29	HAHNFETT
61	22.242	0.79	10.76	Octatriacontyl trifluoroacetate
62	22.481	1.57	18.95	15-Isobutyl-(13.alpha.H)-isocopalane
63	22.775	0.53	7.69	14-.BETA.-H-PREGNA
64	22.916	0.89	12.24	D-Homoandrostane, (5.alpha.,13.alpha.)-
65	23.125	0.78	11.53	E,E,Z-1,3,12-Nonadecatriene-5,14-diol
66	23.326	0.65	9.66	14-.BETA.-H-PREGNA
67	23.508	0.38	6.02	2-Methyl-3-[(1S,2S)-1,3,3-trimethyl-2-(2-hydroxyethyl)cyclohexyl]tetrahydrofuran
68	23.671	1.08	15.29	2(1H)-Naphthalenone, 3,4,4a,5,6,7,8,8a.alpha.-octahydro-5.alpha.-hydroxy-4a.alpha.,7,
69	23.901	1.13	16.47	2-Methyltetracosane
70	24.189	0.45	7.55	HAHNFETT
71	24.404	0.62	10.28	14-.BETA.-H-PREGNA
72	24.562	0.82	11.84	PREGNANE, (5.BETA.)-
73	24.749	0.63	11.18	SCLEREODIOL
74	24.958	0.32	5.82	HAHNFETT
75	25.054	0.46	8.46	Eicosane

76	25.158	0.54	11.26	CITRONELLYL VALERATE
77	25.424	0.42	9.43	1,1,6-trimethyl-3-methylene-2-(3,6,9,13-tetramethyl-6-ethenye-10,14-dimethylene-penta
78	25.573	0.59	14.04	2H-3,9a-Ethanocyclopent[b]oxocin-2-one, octahydro-5,5,7,11-tetramethyl-, (3S,6as,7R,9
79	25.825	0.33	8.32	HAHNFETT
80	25.971	0.27	6.29	2-Methylhexacosane
81	26.184	0.78	13.73	15-Isobutyl-(13.alpha.H)-isocopalane
82	26.492	0.43	14.12	5.alpha.-Pregnane-12,20-dione
83	26.763	0.54	17.47	D-Homopregnane, (5.alpha.)-
84	27.022	0.26	10.88	1,1,6-trimethyl-3-methylene-2-(3,6,10,13,14-pentamethyl-3-ethenyl-pentadec-4-enye)cyc
85	27.192	0.21	7.80	15-Isobutyl-(13.alpha.H)-isocopalane
86	27.442	0.25	14.79	Tetracontane-1,40-diol
87	27.898	0.27	20.22	Eicosane
88	28.108	0.06	8.38	HAHNFETT
89	29.279	0.04	7.27	15-Isobutyl-(13.alpha.H)-isocopalane
90	29.714	0.03	6.20	2-Methylhexacosane
91	30.257	0.03	6.20	1,2-BENZENEDICARBOXYLIC ACID
92	32.394	0.02	4.63	D-Homoandrostane, (5.alpha.,13.alpha.)-
93	32.542	0.02	7.58	HAHNFETT
94	33.709	0.01	3.41	1,3-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester

LAMPIRAN 3. Foto minyak trafo



Gambar 9. Foto minyak trafo : A. Sampel, B. Pembanding

LAMPIRAN 4. Alat-alat penelitian

Gambar 10. Alat Spektrofotometer GC-MS