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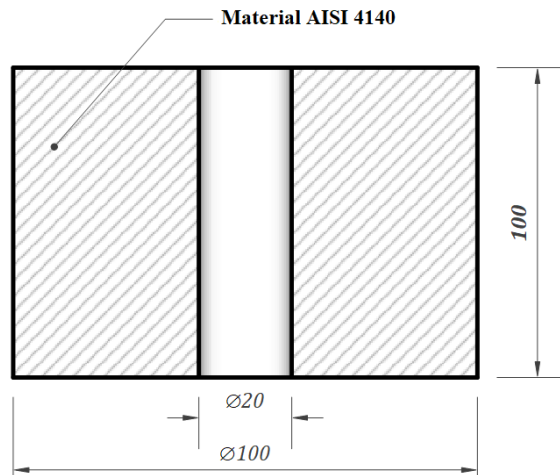
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Lampiran 1 Perhitungan Beban Kompaksi



Diketahui

Diameter lubang cetakan (d) = 20 mm = 20×10^{-3} m

Tekanan Kompaksi (P) = 150 MPa = 150×10^6 N/m²

Ditanyakan: Besar beban kompaksi (dalam Ton)

Solusi sebagai berikut;

$$F = PA$$

$$= 150 \times 10^6 \text{ [N/m}^2\text{]} \times 0.25 \times \pi \times (20 \times 10^{-3})^2 \text{ [m}^2\text{]}$$

$$= 150 \times 10^6 \times 0.25 \times \pi \times 400 \times 10^{-6} \text{ [N]}$$

$$= 47.100 \text{ N}$$

$$= 4.710 \text{ kg} \rightarrow \mathbf{4,71 \text{ Ton}}$$

Lampiran 2 Perhitungan Komposisi Campuran

Fraksi komposisi campuran dalam fraksi volume

Kode	Komposisi	Fraksi (% Volume)				Densitas Teoritis (g/cm ³)
		Al	Mg	Gr	Cu	
S0	Pure Al	100.0%	0.0%	0.0%	0.0%	2.700
S1	Al-1.5Mg-4Cu-0Gr	94.5%	1.5%	0.0%	4.0%	2.935
S2	Al-1.5Mg-4Cu-1Gr	93.5%	1.5%	1.0%	4.0%	2.931
S3	Al-1.5Mg-4Cu-3Gr	91.5%	1.5%	3.0%	4.0%	2.922
S4	Al-1.5Mg-4Cu-5Gr	89.5%	1.5%	5.0%	4.0%	2.913
S5	Al-1.5Mg-5Gr-0Cu	93.5%	1.5%	5.0%	0.0%	2.664
S6	Al-1.5Mg-5Gr-4Cu	89.5%	1.5%	5.0%	4.0%	2.913
S7	Al-1.5Mg-5Gr-7Cu	86.5%	1.5%	5.0%	7.0%	3.100
S8	Al-1.5Mg-5Gr-10Cu	83.5%	1.5%	5.0%	10.0%	3.288

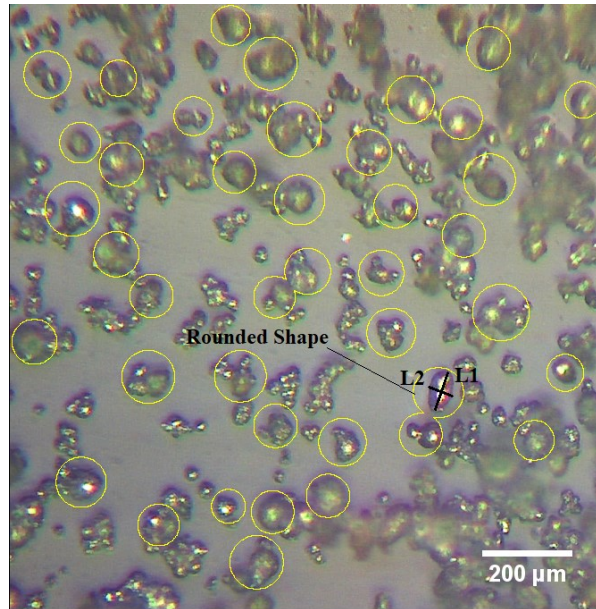
Fraksi komposisi campuran serbuk per 1 sampel uji (ukuran Ø20x6 mm)

Kode	Komposisi	Fraksi (gram)				Berat Campuran
		Al	Mg	Gr	Cu	
S0	Pure Al	5.09	0.00	0.00	0.00	5.087
S1	Al-1.5Mg-4Cu-0Gr	4.81	0.05	0.00	0.67	5.530
S2	Al-1.5Mg-4Cu-1Gr	4.76	0.05	0.04	0.67	5.522
S3	Al-1.5Mg-4Cu-3Gr	4.65	0.05	0.13	0.67	5.505
S4	Al-1.5Mg-4Cu-5Gr	4.55	0.05	0.21	0.67	5.488
S5	Al-1.5Mg-5Gr-0Cu	4.76	0.05	0.21	0.00	5.018
S6	Al-1.5Mg-5Gr-4Cu	4.55	0.05	0.21	0.67	5.488
S7	Al-1.5Mg-5Gr-7Cu	4.40	0.05	0.21	1.18	5.841
S8	Al-1.5Mg-5Gr-10Cu	4.25	0.05	0.21	1.68	6.194

Fraksi komposisi campuran serbuk per 15 sampel uji

Kode	Komposisi	Fraksi (gram)				Berat Campuran
		Al	Mg	Gr	Cu	
S0	Pure Al	76.30	0.00	0.00	0.00	76.302
S1	Al-1.5Mg-4Cu-0Gr	72.11	0.74	0.00	10.11	82.949
S2	Al-1.5Mg-4Cu-1Gr	71.34	0.74	0.64	10.11	82.824
S3	Al-1.5Mg-4Cu-3Gr	69.82	0.74	1.92	10.11	82.576
S4	Al-1.5Mg-4Cu-5Gr	68.29	0.74	3.19	10.11	82.327
S5	Al-1.5Mg-5Gr-0Cu	71.34	0.74	3.19	0.00	75.273
S6	Al-1.5Mg-5Gr-4Cu	68.29	0.74	3.19	10.11	82.327
S7	Al-1.5Mg-5Gr-7Cu	66.00	0.74	3.19	17.69	87.617
S8	Al-1.5Mg-5Gr-10Cu	63.71	0.74	3.19	25.26	92.908
Kebutuhan bahan Baku (gr)		627.20	5.90	18.52	93.48	745.10

Lampiran 3 Estimasi Ukuran Serbuk Aluminium

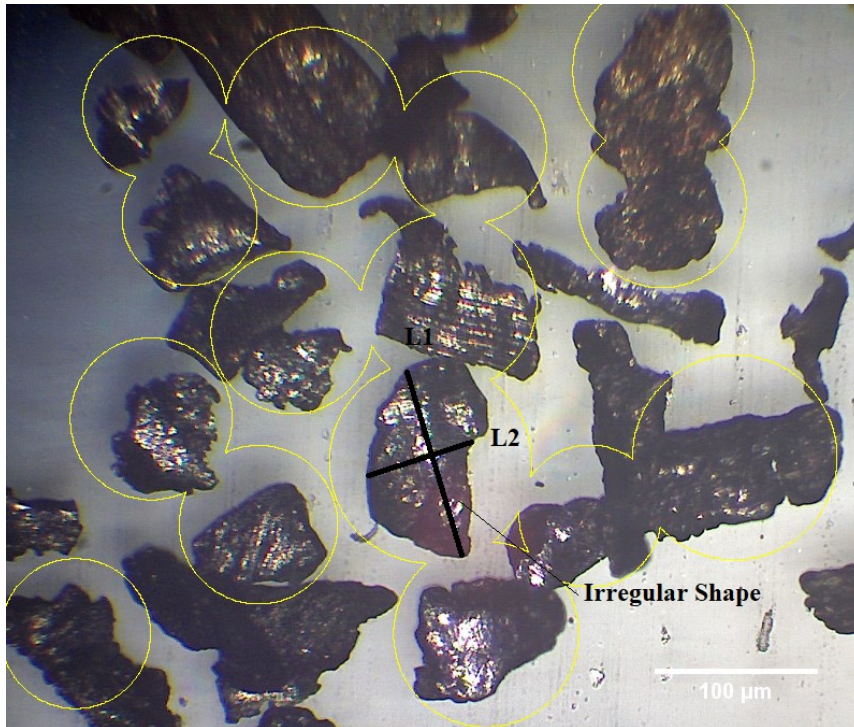


No	L1 (μm)	L2 (μm)	L (μm)
1	43.53	42.07	42.80
2	45.08	50.50	47.79
3	48.48	44.56	46.52
4	38.56	40.26	39.41
5	44.34	43.76	44.05
6	42.59	49.19	45.89
7	43.19	39.61	41.40
8	49.25	39.17	44.21
9	43.24	44.50	43.87
10	44.79	42.29	43.54
11	45.32	45.63	45.48
12	38.11	49.13	43.62
13	41.49	48.62	45.06
14	44.92	44.41	44.67
15	46.86	45.30	46.08
16	41.68	38.09	39.89
17	39.02	47.51	43.27
18	42.78	44.55	43.67
19	43.04	39.08	41.06
20	45.24	46.28	45.76

No	L1 (μm)	L2 (μm)	L (μm)
21	41.59	41.54	41.57
22	41.53	38.60	40.07
23	51.82	49.20	50.51
24	50.06	42.09	46.08
25	38.11	52.54	45.33
26	42.93	38.96	40.95
27	51.32	40.47	45.90
28	51.55	43.39	47.47
29	50.70	46.75	48.73
30	48.06	52.84	50.45
31	39.61	49.28	44.45
32	42.81	48.99	45.90
33	45.43	50.87	48.15
34	48.02	51.66	49.84
35	50.12	52.55	51.34
36	40.32	42.98	41.65
37	38.54	52.10	45.32
38	51.76	42.64	47.20
39	38.29	51.17	44.73
40	50.92	42.64	46.78

Rata-rata (μm) = 45.01

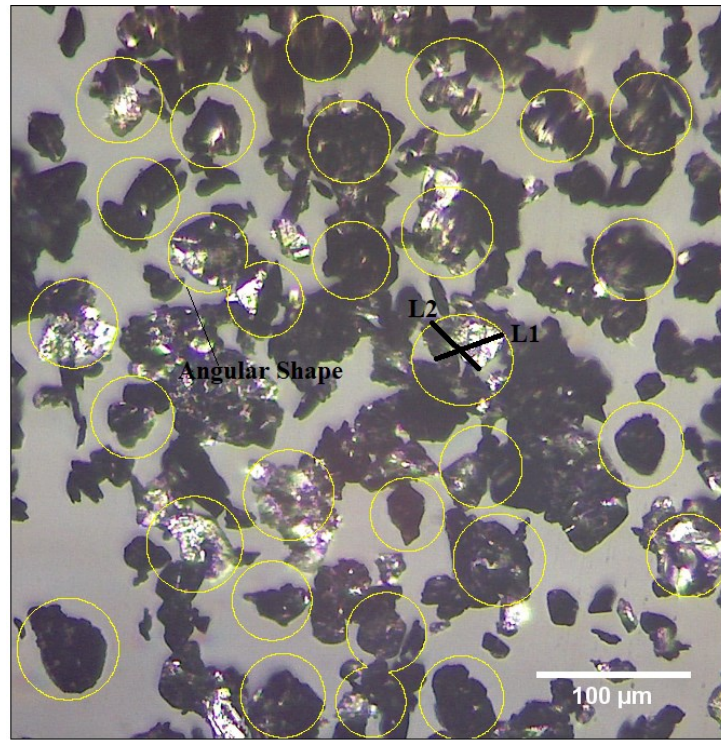
Lampiran 4 Estimasi Ukuran Serbuk Magnesium



No	L1 (μm)	L2 (μm)	L (μm)
1	96.23	93.06	94.65
2	108.94	99.14	104.04
3	95.49	92.43	93.96
4	117.93	109.47	113.70
5	100.20	91.82	96.01
6	93.73	93.37	93.55
7	106.05	91.58	98.82
8	109.00	105.99	107.50
9	118.67	94.83	106.75
10	108.43	94.89	101.66
11	107.16	101.21	104.19
12	118.08	95.94	107.01
13	95.15	91.17	93.16
14	81.00	86.00	83.50
15	114.31	90.64	102.48

Rata-rata (μm) = 100.06

Lampiran 5 Estimasi Ukuran Serbuk Grafit

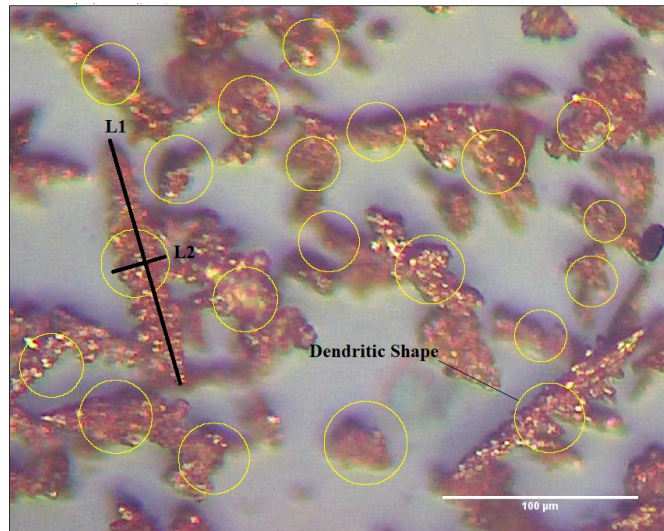


No	L1 (μm)	L2 (μm)	L (μm)
1	46.22	52.83	49.53
2	53.37	69.97	61.67
3	57.53	56.11	56.82
4	53.86	63.25	58.56
5	47.63	67.11	57.37
6	46.72	63.40	55.06
7	52.34	51.16	51.75
8	51.16	51.94	51.55
9	49.67	53.54	51.61
10	48.85	63.82	56.34
11	54.03	66.23	60.13
12	49.78	55.03	52.41
13	56.11	58.73	57.42
14	56.18	67.55	61.87
15	54.99	56.95	55.97

No	L1 (μm)	L2 (μm)	L (μm)
16	59.40	55.74	57.57
17	55.17	50.87	53.02
18	67.13	53.65	60.39
19	66.84	53.19	60.02
20	48.03	54.33	51.18
21	50.06	58.24	54.15
22	46.17	56.74	51.46
23	44.80	52.92	48.86
24	55.78	52.08	53.93
25	48.70	52.82	50.76
26	48.97	59.46	54.22
27	48.17	56.82	52.50
28	69.46	50.36	59.91
29	67.37	52.60	59.99
30	59.31	54.76	57.04

Rata-rata (μm) = 55.43

Lampiran 6 Estimasi Ukuran Serbuk Tembaga

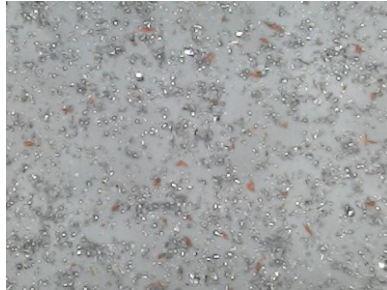


No	L1 (μm)	L2 (μm)	L (μm)
1	165.78	51.26	108.52
2	162.11	48.88	105.50
3	135.33	39.81	87.57
4	128.02	43.40	85.71
5	123.37	41.75	82.56
6	156.65	46.63	101.64
7	125.77	38.49	82.13
8	141.68	48.18	94.93
9	123.54	48.72	86.13
10	98.76	43.29	71.03
11	98.97	86.77	92.87
12	98.65	79.56	89.11
13	122.15	62.56	92.36
14	89.98	77.65	83.82
15	76.00	37.99	57.00
16	97.56	48.96	73.26
17	96.85	69.51	83.18
18	78.92	78.89	78.91
19	123.68	43.88	83.78
20	56.45	56.67	56.56

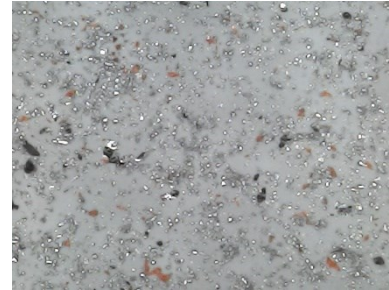
Rata-rata (μm) = **84.83**

Lampiran 7 Fotografi Campuran Serbuk

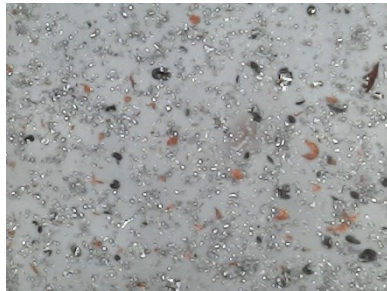
Fotografi campuran serbuk setelah penggilingan selama 120 menit pada putaran 1500 rpm



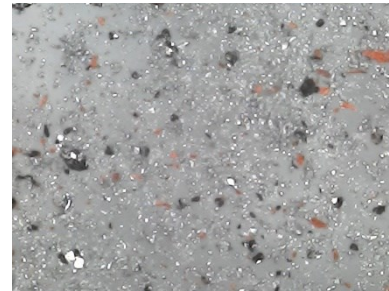
S1 (Al1.5Mg4Cu-0%Gr)



S2 (Al1.5Mg4Cu-1%Gr)



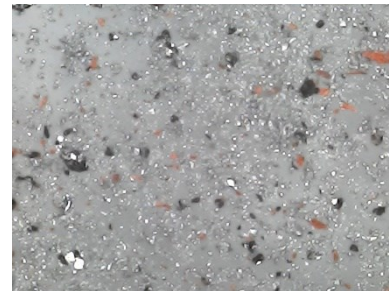
S3 (Al1.5Mg4Cu-3%Gr)



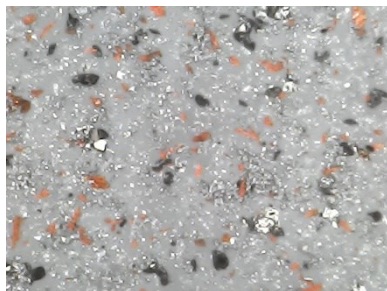
S4 (Al1.5Mg4Cu-5%Gr)



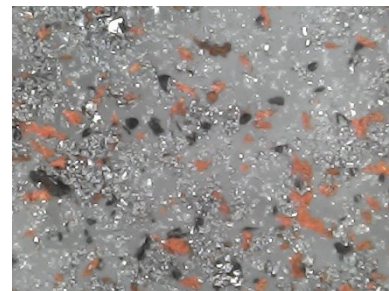
S5 (Al1.5Mg5Gr-0%Cu)



S6 (Al1.5Mg5Gr-4%Cu)



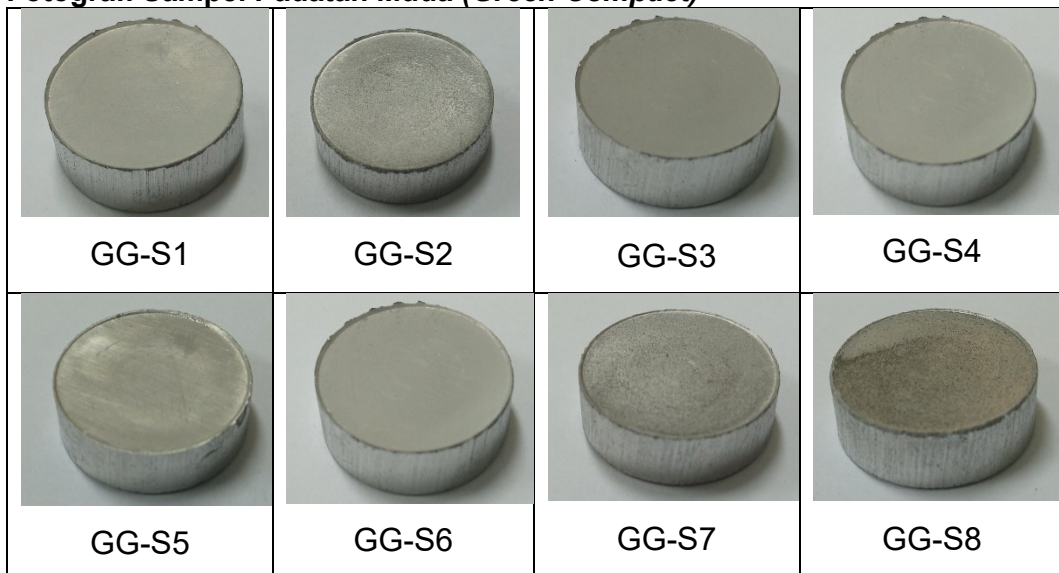
S7 (Al1.5Mg5Gr-7%Cu)



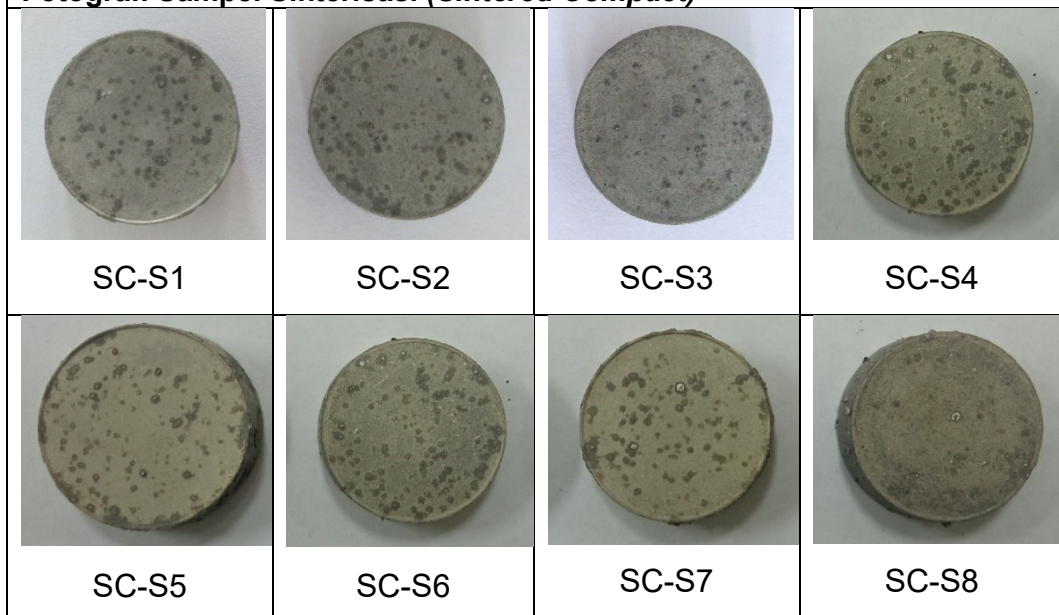
S8 (Al1.5Mg5Gr-10%Cu)

Lampiran 8 Fotografi Sampel *Green Compact* dan *Sintered Compact*

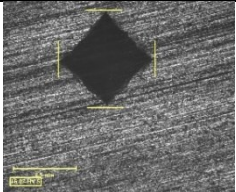
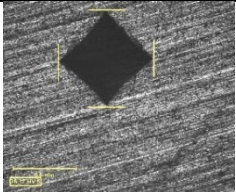
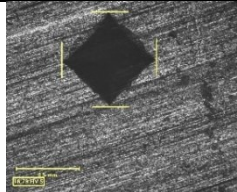
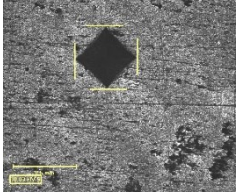
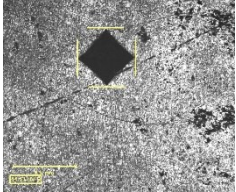
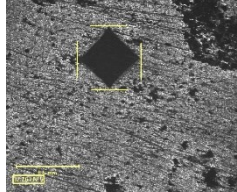
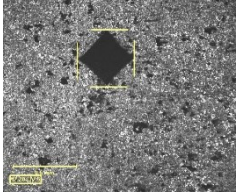
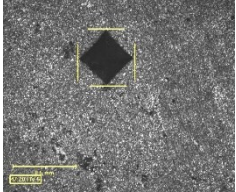
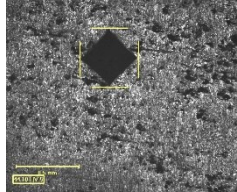
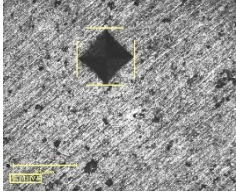
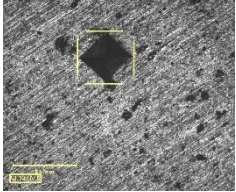
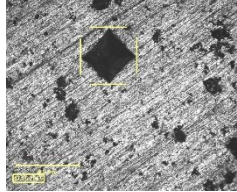
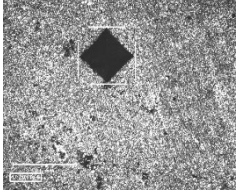
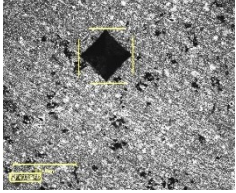
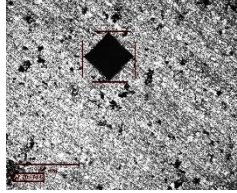
Fotografi Sampel Padatan Muda (*Green Compact*)

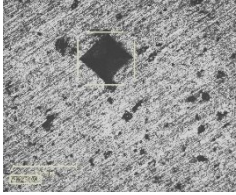
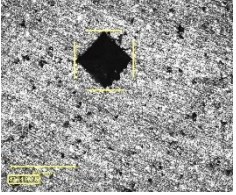
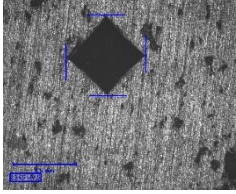
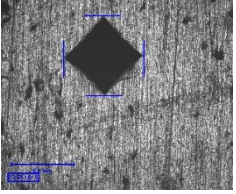
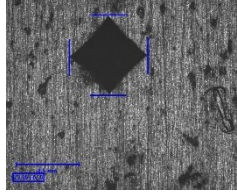
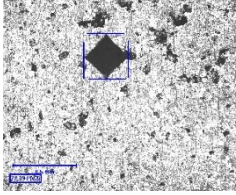
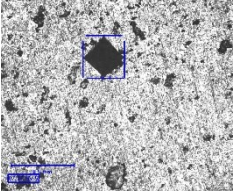
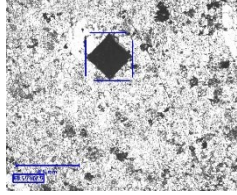
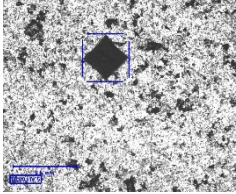
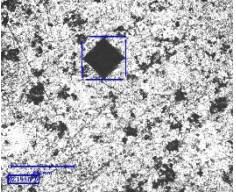
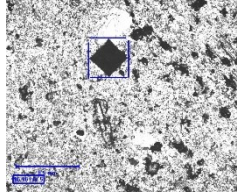
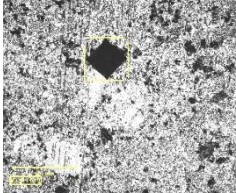
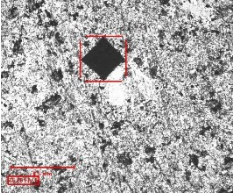
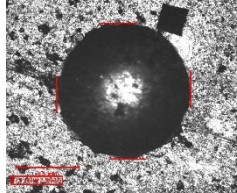


Fotografi Sampel Sinterisasi (*Sintered Compact*)

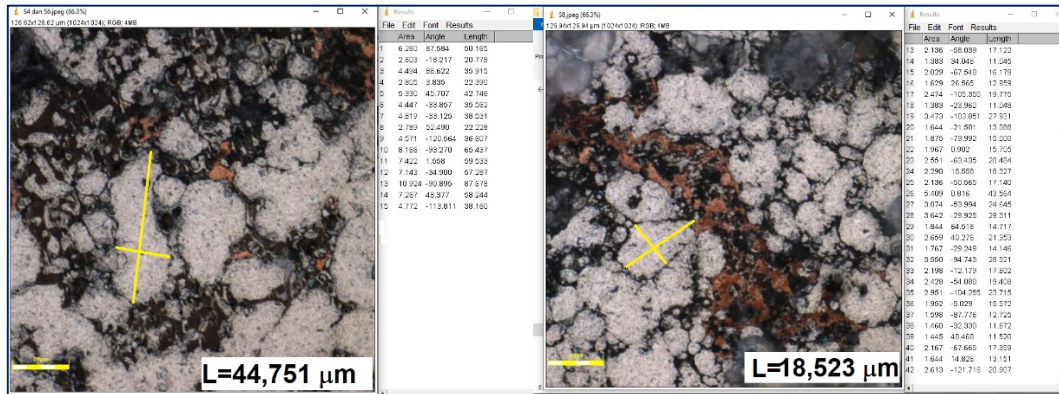


Lampiran 9 Foto Indentasi Kekerasan

	Posisi Kiri (-2.5 mm)	Posisi Tengah	Posisi Kanan (+2.5 mm)
S0 (16.14 HV)	 P1= 16.07 HV	 P2= 16.17 HV	 P3= 16.97 HV
S1 (40.17 HV)	 P1= 38.83 HV	 P2= 44.43 HV	 P3= 37.26 HV
S2 (46.25 HV)	 P1= 47.28 HV	 P2= 47.29HV	 P3= 44.18 HV
S3 (48.54 HV)	 P1= 46.74 HV	 P2= 51.32 HV	 P3= 47.55 HV
S4=S6 (50.37 HV)	 P1= 47.28 HV	 P2= 51.63 HV	 P3= 57.70 HV

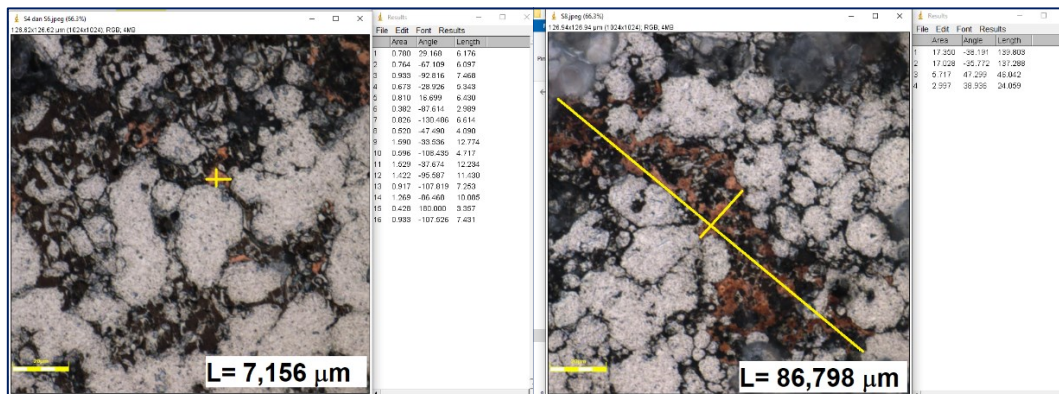
	 P4= 51.32 HV	 P5= 43.94 HV	
S5 (23.75 HV)	 P1= 23.65 HV	 P2= 23.65 HV	 P3= 23.95 HV
S7 (77.77HV)	 P1= 77.39 HV	 P2= 87.37 HV	 P3= 68.55 HV
S8 (81.52 HV)	 P1= 70.00 HV	 P2= 82.15 HV	 P3= 96.90HV
	 P4= 83.41 HV	 P5= 75.16 HV	 HB= 67.1 HBN

Lampiran 10 Estimasi Ukuran Butir Al dan Cu Sintered Compact



Ukuran butir α -Al pada S4 =
44,751 μ m

Ukuran butir α -Al pada S8 =
18,523 μ m



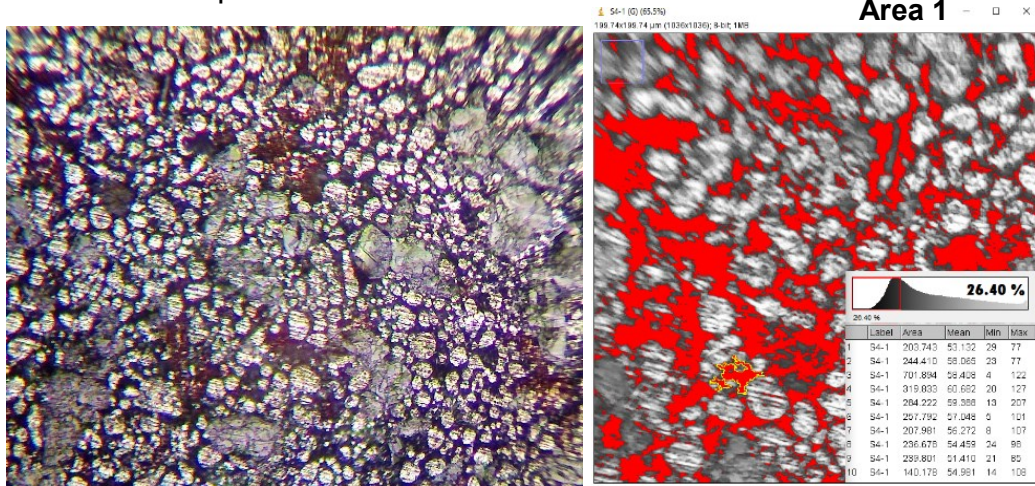
Ukuran butir Cu pada S4 =
7,156 μ m

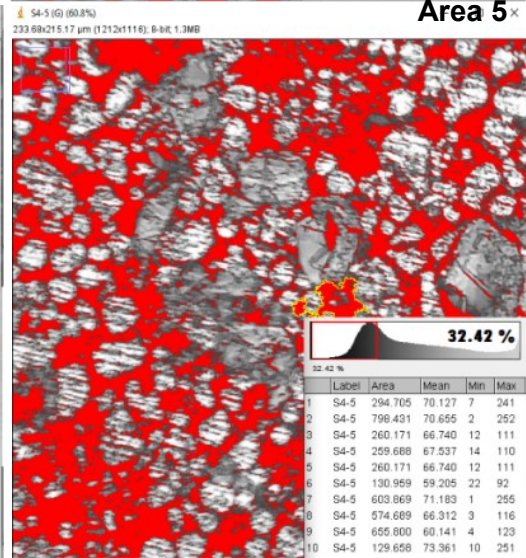
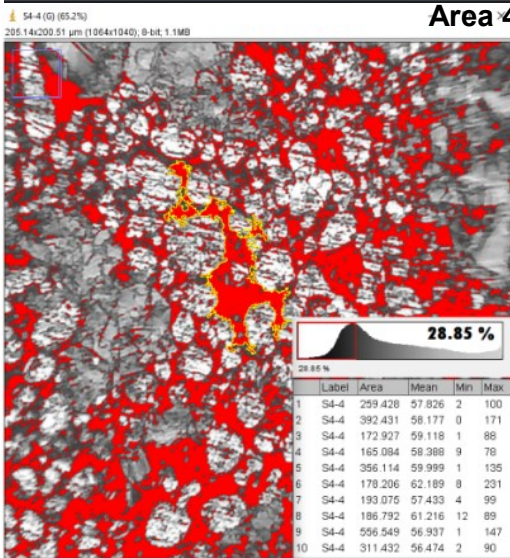
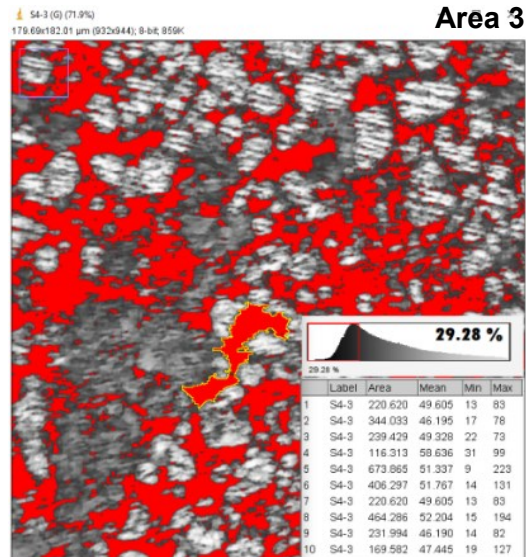
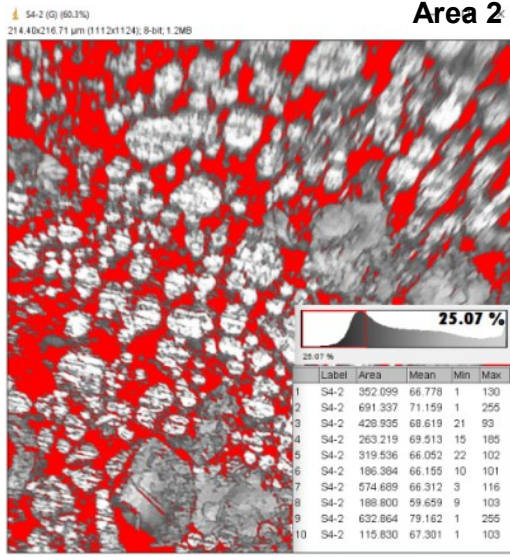
Ukuran butir Cu pada S8 =
86,798 μ m

Lampiran 11 Metode Estimasi Ukuran Pori *Green Compact*

Data Porositas Green Compact									
I	A (μm^2)	II	A (μm^2)	III	A (μm^2)	IV	A (μm^2)	V	A (μm^2)
1	203.743	1	352.099	1	220.620	1	259.428	1	294.705
2	244.410	2	691.337	2	344.033	2	392.431	2	798.431
3	701.894	3	428.935	3	239.429	3	172.927	3	260.171
4	319.833	4	263.219	4	116.313	4	165.084	4	259.688
5	284.222	5	319.536	5	673.865	5	356.114	5	260.171
6	257.792	6	186.384	6	406.297	6	178.206	6	130.959
7	207.981	7	574.689	7	220.620	7	193.075	7	603.869
8	236.678	8	188.800	8	464.286	8	186.792	8	574.689
9	239.801	9	632.864	9	231.994	9	556.549	9	655.800
10	140.178	10	115.830	10	169.582	10	311.432	10	129.658
Av	283.653		375.369		308.704		277.204		396.814
p	26.40%		25.07%		29.28%		28.86%		32.42%
								Luas Pori Total (μm^2) =	1641.744
								Tingkat porositas =	28.41%

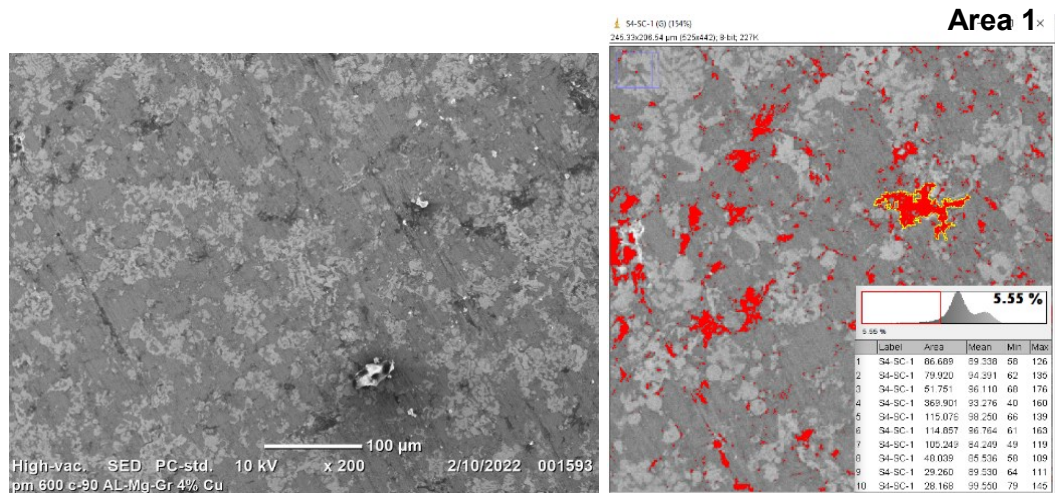
Citra observasi porositas GC-S4

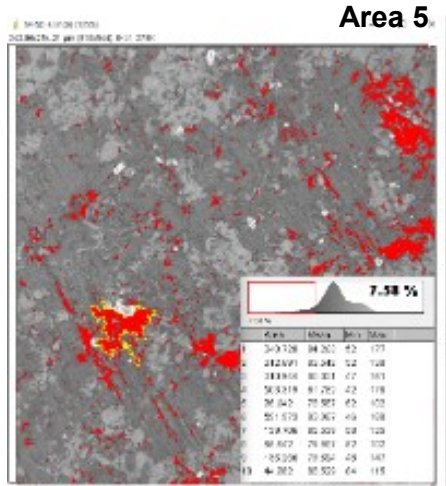
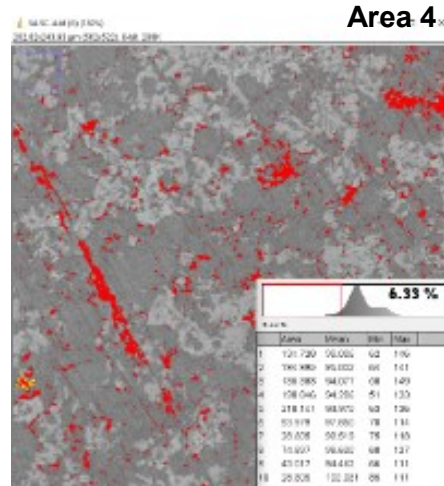
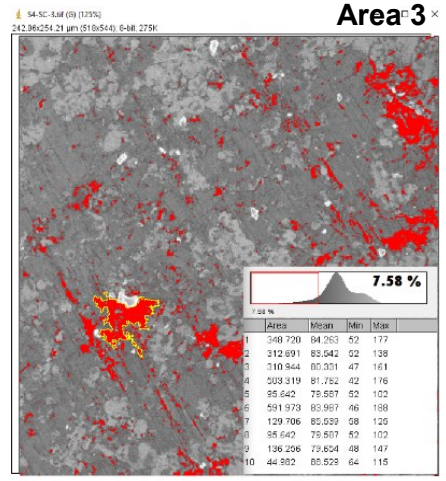
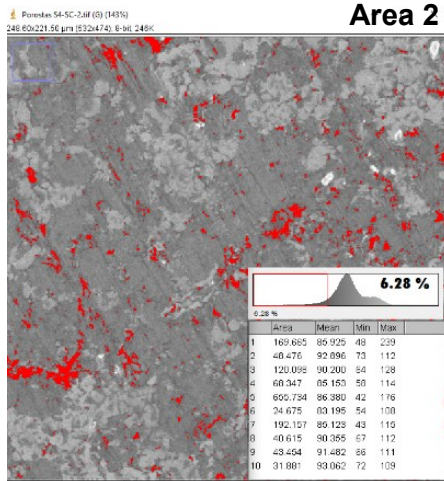




Lampiran 12 Metode Estimasi Ukuran Pori Sintered Compact

Data Porositas Sintered Compact									
I	A (μm^2)	II	A (μm^2)	III	A (μm^2)	IV	A (μm^2)	V	A (μm^2)
1	86.689	1	169.665	1	348.720	1	134.728	1	59.831
2	79.920	2	48.476	2	312.691	2	194.995	2	67.761
3	51.751	3	10.098	3	310.944	3	135.383	3	54.808
4	369.901	4	68.347	4	503.319	4	190.846	4	89.964
5	115.076	5	655.734	5	95.642	5	218.141	5	52.406
6	114.857	6	24.675	6	591.973	6	63.979	6	169.447
7	105.249	7	192.157	7	129.706	7	28.605	7	50.878
8	48.099	8	40.615	8	95.642	8	74.897	8	38.213
9	29.260	9	43.454	9	136.256	9	43.017	9	32.972
10	28.168	10	31.881	10	44.982	10	28.605	10	1384.400
Av	102.897		128.510		256.988		111.320		200.068
p	5.55%		6.28%		7.58%		6.33%		6.67%
Luas Pori Total (μm^2) =								799.782	
Tingkat porositas =								6.48%	





Lampiran 13 Resume Tabulasi Data Penelitian

Tabel 1. Tabulasi data densitas relatif *green compact*

Kode	Densitas Teoritis	Sampel 1		Sampel 2		Sampel 3		Mean	STDV
		ρ_1 (g/cm ³)	RD-GC1	ρ_2 (g/cm ³)	RD-GC2	ρ_3 (g/cm ³)	RD-GC3		
S0	2.700	2.377	88.0%	2.430	90.0%	2.403	89.0%	89.01%	0.99%
S1	2.935	2.438	83.0%	2.485	84.7%	2.474	84.3%	84.00%	0.85%
S2	2.931	2.495	85.1%	2.525	86.2%	2.481	84.7%	85.32%	0.76%
S3	2.922	2.519	86.2%	2.494	85.3%	2.477	84.8%	85.45%	0.73%
S4	2.913	2.551	87.6%	2.539	87.1%	2.563	88.0%	87.56%	0.42%
S5	2.664	2.372	89.1%	2.352	88.3%	2.335	87.7%	88.35%	0.69%
S6	2.913	2.551	87.6%	2.539	87.1%	2.563	88.0%	87.56%	0.42%
S7	3.100	2.676	86.3%	2.646	85.4%	2.676	86.3%	85.99%	0.55%
S8	3.288	2.825	85.9%	2.787	84.8%	2.827	86.0%	85.57%	0.69%

Tabel 2. Tabulasi data densitas relatif *sintered compact*

Kode	Densitas Teoritis	Sampel 1		Sampel 2		Sampel 3		Mean	STDV
		ρ_1 (g/cm ³)	RD-SC1	ρ_2 (g/cm ³)	RD-SC2	ρ_3 (g/cm ³)	RD-SC3		
S0	2.700	2.447	90.6%	2.493	92.3%	2.482	91.9%	91.64%	0.89%
S1	2.935	2.465	84.0%	2.522	85.9%	2.491	84.9%	84.92%	0.97%
S2	2.931	2.540	86.7%	2.569	87.6%	2.511	85.7%	86.67%	0.98%
S3	2.922	2.565	87.8%	2.533	86.7%	2.501	85.6%	86.69%	1.10%
S4	2.913	2.612	89.7%	2.583	88.7%	2.554	87.7%	88.67%	1.00%
S5	2.664	2.433	91.3%	2.401	90.1%	2.385	89.5%	90.33%	0.92%
S6	2.913	2.612	89.7%	2.583	88.7%	2.554	87.7%	88.67%	1.00%
S7	3.100	2.734	88.2%	2.699	87.1%	2.664	85.9%	87.07%	1.13%
S8	3.288	2.900	88.2%	2.851	86.7%	2.851	86.7%	87.21%	0.87%

Tabel 3 Tabulasi data tingkat porositas

Kode	Sampel 1			Sampel 2			Sampel 3			Mean	STDV
	m_1	m_2	Pori 1 (%)	m_1	m_2	Pori 2 (%)	m_1	m_2	Pori 3 (%)		
S0	4.904	5.129	4.59%	4.904	5.108	4.17%	4.901	5.088	3.81%	4.19%	0.39%
S1	4.904	5.230	6.64%	4.945	5.254	6.24%	4.965	5.255	5.84%	6.24%	0.40%
S2	4.967	5.252	5.74%	4.948	5.247	6.03%	4.976	5.292	6.35%	6.04%	0.30%
S3	4.955	5.275	6.46%	4.914	5.200	5.83%	4.929	5.190	5.29%	5.86%	0.58%
S4	4.821	5.053	4.80%	4.960	5.218	5.20%	4.853	5.110	5.30%	5.10%	0.26%
S5	4.946	5.221	5.58%	4.950	5.201	5.07%	4.955	5.183	4.58%	5.08%	0.50%
S6	4.821	5.053	4.80%	4.960	5.218	5.20%	4.853	5.110	5.30%	5.10%	0.26%
S7	4.825	5.129	6.31%	4.903	5.189	5.83%	4.817	5.071	5.29%	5.81%	0.51%
S8	4.887	5.269	7.81%	4.933	5.285	7.12%	4.945	5.290	6.99%	7.30%	0.44%

Tabel 4 Tabulasi data tingkat penyusutan

Kode	Sampel 1			Sampel 2			Sampel 3			Mean	STDV
	V _{gc1}	V _{sc1}	Sh1	V _{gc2}	V _{sc2}	Sh2	V _{gc3}	V _{sc4}	Sh3		
S0	2.064	2.004	2.92%	2.019	1.967	2.57%	2.042	1.974	3.33%	2.94%	0.38%
S1	2.014	1.990	1.22%	1.996	1.961	1.77%	2.013	1.993	0.98%	1.32%	0.40%
S2	1.991	1.955	1.79%	1.960	1.926	1.74%	2.005	1.981	1.20%	1.58%	0.33%
S3	1.969	1.932	1.93%	1.989	1.940	2.45%	2.002	1.971	1.57%	1.98%	0.44%
S4	1.891	1.846	2.42%	1.956	1.920	1.82%	1.936	1.900	1.88%	2.04%	0.33%
S5	2.087	2.033	2.58%	2.107	2.062	2.12%	2.122	2.078	2.07%	2.26%	0.28%
S6	1.891	1.846	2.42%	1.956	1.920	1.82%	1.936	1.900	1.88%	2.04%	0.33%
S7	1.809	1.764	2.46%	1.855	1.816	2.11%	1.835	1.808	1.46%	2.01%	0.50%
S8	1.731	1.685	2.63%	1.774	1.731	2.44%	1.761	1.735	1.52%	2.20%	0.59%

Tabel 5 Tabulasi data berat jenis komposit setelah sinterisasi

Kode	ρ_1 (g/cm ³)	ρ_2 (g/cm ³)	ρ_3 (g/cm ³)	ρ_4 (g/cm ³)	ρ_5 (g/cm ³)	mean	stdv
S0	2.447	2.493	2.482	2.322	2.450	2.439	0.068
S1	2.465	2.522	2.491	2.378	2.510	2.473	0.057
S2	2.540	2.569	2.511	2.471	2.370	2.492	0.077
S3	2.565	2.533	2.501	2.426	2.470	2.499	0.054
S4	2.612	2.583	2.554	2.414	2.620	2.557	0.084
S5	2.433	2.401	2.385	2.340	2.550	2.422	0.079
S6	2.612	2.583	2.554	2.414	2.620	2.557	0.084
S7	2.734	2.699	2.664	2.800	3.130	2.806	0.188
S8	2.900	2.851	2.851	3.013	3.570	3.037	0.305

Tabel 6 Tabel rasio kekuatan terhadap berat

Komposit	Kode	Kekerasan (HV)	Densitas (g/cm ³)	Rasio Kekuatan/Berat
CuPb10Sn10	DYB302, CS800,SY	63.16	9.02	7.0
CuSnPb24	DYB303, CSB-720	47.37	8.92	5.3
CuPb24Sn4	DYB304,SP	42.11	9.45	4.5
CuPb30	DYB307, CSB700	31.58	10.55	3.0
Pure Al	Komposit S0	16.14	2.44	6.6
Al1.5Mg4Cu0Gr	Komposit S1	40.17	2.47	16.2
Al1.5Mg4Cu1Gr	Komposit S2	46.25	2.49	18.6
Al1.5Mg4Cu3Gr	Komposit S3	48.54	2.50	19.4
Al1.5Mg4Cu5Gr	Komposit S4	50.37	2.56	19.7
Al1.5Mg5Gr0Cu	Komposit S5	23.75	2.42	9.8
Al1.5Mg5Gr4Cu	Komposit S6	50.37	2.56	19.7
Al1.5Mg5Gr7Cu	Komposit S7	77.77	2.81	27.7
Al1.5Mg5Gr10Cu	Komposit S8	81.52	3.04	26.8

Lampiran 14 Resume Tabulasi Data Uji Keausan

Tabel 4.a Keausan pada 2,0N, 50m dan 0,4 m/s

Kode	Komposisi	Berat jenis	Laju Keausan pada (2N, 50m dan 0,4 m/s)			
			M,loss, gr	mm ³	mm ³ /m	mm ³ /m-N
S0	Pure Al	2.474	0.023	9.296	0.186	0.093
S1	Al-1.5Mg-4Cu-0Gr	2.492	0.022	8.827	0.177	0.088
S2	Al-1.5Mg-4Cu-1Gr	2.540	0.018	7.086	0.142	0.071
S3	Al-1.5Mg-4Cu-3Gr	2.533	0.015	5.922	0.118	0.059
S4	Al-1.5Mg-4Cu-5Gr	2.583	0.015	5.807	0.116	0.058
S5	Al-1.5Mg-5Gr-0Cu	2.406	0.020	8.312	0.166	0.083
S6	Al-1.5Mg-5Gr-4Cu	2.583	0.015	5.807	0.116	0.058
S7	Al-1.5Mg-5Gr-7Cu	2.699	0.010	3.705	0.074	0.037
S8	Al-1.5Mg-5Gr-10Cu	2.867	0.009	3.139	0.063	0.031

Tabel 4.b Keausan pada 2,5N, 50m dan 0,4 m/s

Kode	Komposisi	Berat jenis	Laju Keausan pada (2.5N, 50m dan 0,4 m/s)			
			M,loss, gr	mm ³	mm ³ /m	mm ³ /m-N
S0	Pure Al	2.474	0.028	11.316	0.226	0.091
S1	Al-1.5Mg-4Cu-0Gr	2.492	0.024	9.629	0.193	0.077
S2	Al-1.5Mg-4Cu-1Gr	2.540	0.023	9.055	0.181	0.072
S3	Al-1.5Mg-4Cu-3Gr	2.533	0.020	7.896	0.158	0.063
S4	Al-1.5Mg-4Cu-5Gr	2.583	0.020	7.743	0.155	0.062
S5	Al-1.5Mg-5Gr-0Cu	2.406	0.022	9.144	0.183	0.073
S6	Al-1.5Mg-5Gr-4Cu	2.583	0.020	7.743	0.155	0.062
S7	Al-1.5Mg-5Gr-7Cu	2.699	0.014	5.186	0.104	0.041
S8	Al-1.5Mg-5Gr-10Cu	2.867	0.012	4.185	0.084	0.033

Tabel 4.c Keausan pada 3,0N 50m dan 0,4 m/s

Kode	Komposisi	Berat jenis	Laju Keausan pada (3N, 50m dan 0,4 m/s)			
			M,loss, gr	mm ³	mm ³ /m	mm ³ /m-N
S0	Pure Al	2.474	0.043	17.379	0.348	0.116
S1	Al-1.5Mg-4Cu-0Gr	2.492	0.035	14.042	0.281	0.094
S2	Al-1.5Mg-4Cu-1Gr	2.540	0.031	12.205	0.244	0.081
S3	Al-1.5Mg-4Cu-3Gr	2.533	0.029	11.449	0.229	0.076
S4	Al-1.5Mg-4Cu-5Gr	2.583	0.028	10.840	0.217	0.072
S5	Al-1.5Mg-5Gr-0Cu	2.406	0.032	13.300	0.266	0.089
S6	Al-1.5Mg-5Gr-4Cu	2.583	0.028	10.840	0.217	0.072
S7	Al-1.5Mg-5Gr-7Cu	2.699	0.027	10.002	0.200	0.067
S8	Al-1.5Mg-5Gr-10Cu	2.867	0.022	7.673	0.153	0.051

Lampiran 15 Daftar Mesin dan Perlengkapan Penelitian



SEM (Jeol JCM-6000Plus with EDS)



XRD Rigaku Miniflex II



OM Raxvision MM10A with Optilab



Furnace Lindberg Blue M-Thermo



Mesin uji aus Pin on disc test



Timbangan elektronik, 0.001 gram



Wilson Hardness UH250



Hydraulic Press Type 16T