

DAFTAR PUSTAKA

- Abbass, M. K., & Sultan, B. F. (2019). *Effect of Al₂O₃ Nano Particles on Corrosion Behaviour of Aluminum Alloy (Al-4.5wt% Cu-1.5wt% Mg) Fabricated by Powder Metallurgy*. 11(1), 25–31.
- Barsoum, M.W., (1997). “Fundamental of Ceramics”, Mc Graw-Hill Book Co New York.
- Basuki Widodo., & Anang Subardi. (2019). Pengujian Sifat Mekanik dan Struktur Mikro Aluminium Matrix Composite (Amc) Berpenguat Partikel Silikon Karbida (SiC) dan Alumina (AL₂O₃)
- Bayu Sukarno Hadilaksa. (2019). Pengaruh Variasi Kompaksi terhadap Densitas dan Foto Mikro Komposit Al-SiC dengan Metode Metalurgi Serbuk
- Boland, C. D., Hexemer, R. L., Donaldson, I. W., & Bishop, D. P. (2013). Industrial processing of a novel Al-Cu-Mg powder metallurgy alloy. *Materials Science and Engineering A*, 559, 902–908.
<https://doi.org/10.1016/j.msea.2012.09.049>
- Budiarto. (2019). *Sintesis Paduan Alumunium (6061) dengan Metalurgi Serbuk Bahan Fin Rocket*.
- Callister, W. D. (2007). *Materials Science and Engineering: An Introduction* (Wiley Asia).
- Callister Jr, W.D. dan Rethwisch, D.G., (2009). *Materials Science and Engineering: An Introduction*, 8th ed., John Wiley and Sons, NewYork.
- Callister, W. D., & Rethwisch, D. G. (2016). *Fundamentals of materials science and engineering : an integrated approach*. In *Wiley*.
<https://www.wiley.com/en-us/Fundamentals+of+Materials+Science+and+Engineering%3A+An+Integrated+Approach%2C+5th+Edition-p-9781119175506R120>
- Clyne, T.W., (2001). Metal Matrix Composites: Matrices and Processing, *Encyclopaedia of Materials: Science and Technology*, A Mortensen (ed.), Elsevier.
- Cristofilini I., Molinari A., Pederzini J., Rabelli A., (2018). From experimental data, the mechanics relationships describing the behaviour of four different low alloyed steel powders during uniaxial cold compaction, *Powder*

- Metallurgy Journal, 61(1), 10-20.
- D.L. McDanel. (1985). Metall. Trans. A 16, 1105.
- Dhian Ekawati. (2008). Pengaruh Temperatur Sinter Terhadap Karakteristik Komposit Aluminium Grafit Dengan Wetting Agent Tembaga.
- E.O. Olakanmi, R.F.Cochrane, K.W.Dalgarno. (2015). A review on selective laser sintering/melting (SLS/SLM) of aluminium alloy powders: Processing, microstructure, and properties.
- F. Thumler, 1993. Powder Metallurgy. Institute Of Material, London. German, R.M., 1984. Powder Metallurgy Science. Metal Powder Industries Federation. Princeton, New Jersey.
- Fahmi Azis, Sunardi, Agus Pramono. (2012). Analisa Pengaruh Komperesibilitas Metalurgi Serbuk Terhadap Karakteristik Fisik Pada Komposit Matriks Logam Alumunium Berpenguat Alumina
- German, R. M. (1994). *Powder Metallurgy Science* (Second Edi).
- Gibson , Ronald F. (1994). Principles of Composite Material Mechanics. Singapore: McGraw-Hill.
- Gökçe, A., Findik, F., & Kurt, A. O. (2011). Microstructural examination and properties of premixed Al-Cu-Mg powder metallurgy alloy. *Materials Characterization*, 62(7), 730–735.
<https://doi.org/10.1016/j.matchar.2011.04.021>
- Hadi, S. (2017). *Teknologi Bahan Lanjut. Komposit*, 103.
- Kalpakjian, S. (1989). *Manufacturing Engineering and Technology*.
- Krevelen, D.W., (1994). Properties of Polymer, Their Conrelation with Chemical Structure, Their Numerical Estimated and Prediction from Additional Group Contributions, Threed Edition, Elsevier Science B.V. Amsterdam, Netherlands.
- Lestari, Franciska P., Saputra, B. A., Erryani, A., Mulyati, I., Dwijaya, M. S., & Kartika, I. (2021). Analisis Variasi Temperatur Sintering dan Ukuran Agen Pengembang Dolomit terhadap Fabrikasi Paduan Logam Mg-Ca-Zn Berpori Tertutup dengan Proses Metalurgi Serbuk. *Teknik*, 42(2), 128-136.
<https://doi.org/10.14710/teknik.v42i2.36978>.
- M. M. Schwartz., (1984). Composite Materials Handbook, McGraw-Hill Book

Company, New York.

- Matli, P. R., Fareeha, U., Shakoor, R. A., & Mohamed, A. M. A. (2018). A comparative study of structural and mechanical properties of Al-Cu composites prepared by vacuum and microwave sintering techniques. *Journal of Materials Research and Technology*, 7(2), 165–172.
<https://doi.org/10.1016/j.jmrt.2017.10.003>
- Mehta, P.K., (1986), “Concrete Structure Properties and Materials”. Prentice Hall, Inc., Englewood Cliffs, New Jersey.
- Montes J.M., Cuevas F.G., Cintas J., Ternero F., Cabalero S., (2018). On the compressibility of metal powder, *Powder Metallurgy Journal*, 61(3), 219-230.
- Mustika T.B., Sugiyono I.N., Jujur., (2011). Pembuatan komposit AC8A/SICP dengan metode hot press metalurgi serbuk, *Majalah Metalurgi*, 26, 3.
- Nurmawati. (2008). Pengaruh Waktu Tahan Sinter Dan Fraksi Volume Penguat Al₂O₃ Terhadap Karakteristik Komposit Laminat Hibrid Al/SiC-Al₂O₃ Produk Metalurgi Serbuk.
- Nuruzzaman, D. M., Jamaludin, S. N. S., Kamaruzaman, F. F. B., Basri, S., & Zulkifli, N. A. M. B. (2015). Fabrication and mechanical properties of aluminium-aluminium oxide metal matrix composites. *International Journal of Mechanical and Mechatronics Engineering*, 15(6), 68–75.
- P. M. Ajayan, T.W. Ebbesen, T. Ichihashi, S. Iljilma, K. Tanigaki, H. H. (1993). Opening Carbon Nanotubes With Oxygen and Implications for Filling. *Letter to Nature*, 362, 522.
- Pitchayyapillai, G., Seenikannan, P., Raja, K., & Chandrasekaran, K. (2016). *Al6061 Hybrid Metal Matrix Composite Reinforced with Alumina and Molybdenum Disulphide*. 2016.
- Rahimian, M., Ehsani, N., Parvin, N., & Baharvandi, H. reza. (2009). The effect of particle size, sintering temperature and sintering time on the properties of Al-Al₂O₃ composites, made by powder metallurgy. *Journal of Materials Processing Technology*, 209(14), 5387–5393.
<https://doi.org/10.1016/j.jmatprotec.2009.04.007>
- Ramnath, B. V., Elanchezian, C., Annamalai, R. M., .Aravind, S., Atreya, T. S.

- A., Vignesh, V., & Subramanian, C. (2014). Aluminium metal matrix composites - A review. *Reviews on Advanced Materials Science*, 38(1), 55–60.
- Rodríguez-Cabriales, G., Lometo-Sánchez, A. M., Guía-Tello, J. C., Medrano-Prieto, H. M., Gutiérrez-Castañeda, E. J., Estrada-Guel, I., Garay-Reyes, C. G., Hernández-Rivera, J. L., Cruz-Rivera, J. J., Maldonado-Orozco, M. C., & Martínez-Sánchez, R. (2020). Synthesis and characterization of Al-Cu-Mg system reinforced with tungsten carbide through powder metallurgy. *Materials Today Communications*, 22(July), 100758.
<https://doi.org/10.1016/j.mtcomm.2019.100758>
- Rohatgi, P. (1991). Cast Aluminum-Matrix Composites for Automotive Applications. *JOM*, 43(4), 10–15.
- Rusianto, T. (2009). Hot Pressing Metalurgi Serbuk Aluminium Dengan Variasi Suhu Pemanasan
- S. Iman, P. Agus, H. Ricki, J. T. (2018). *Studi Karakteristik Sifat Mekanik Alumunium Matrix Composite (AMC) Paduan AL,5% Cu, 12%Mg, 15%SiC Hasil Proses Stir Casting dengan Variasi Temperatur Pendinginan*. 12(2), 151–164.
- Safrudin M., Yafiedan, Widyastuti. (2014). Pengaruh variasi temperatur sintering dan waktu tahan sintering terhadap densitas dan kekerasan pada MMC W–Cu melalui proses metalurgi serbuk, *Jurnal Teknik Pomits*, 3(1), 2337–3539.
- Sahin Y. dan Murphy, S., (1996), The Effect of Fibre Orientation of The Dry Sliding Wear of Borsic Reinforced Aluminium Alloy, *S. Mater Sci*, 34, pp.5399-5407.
- Samlawi, A. K., & Siswanto, R. (2016). Diktat Bahan Kuliah Material Teknik. *Universitas Lambung Mangkurat*, 3, 8, 56–59.
- Smallman, dan Bishop., (2000). *Metalurgi Fisik Modern dan Rekayasa Material*, Erlangga, Jakarta.
- Suarsana K, Rudy S, A Suprpto, Anindito P, P Wijaya Sunu, (2015). Pengaruh Komposisi Penguat SiC Wisker dan Al₂O₃ pada Aluminium Matrix Composite (AMC) terhadap Kekerasan Setelah Proses Sintering. *Prosiding Konfferensi Nasional Perhotelan, Universitas Udayana Bali, Nomor 1*.

Volume 3. ISSN 2338 – 414X.

- Surappa, M. K. (2003). *Aluminium matrix composites : Challenges and opportunities*. 28(April), 319–334.
- Surdia, Tata dan Saito, Shinroku. (1999). *Pengetahuan Bahan Teknik*. Jakarta: Pradnya Paramita.
- Suwanda, T. (2006). Dan Waktu Sintering Terhadap Kekerasan Dan Berat Jenis Aluminium Pada Proses. *Jurnal Ilmiah Semesta Teknik*, 9, 187–198.
- Tok, A. I. Y., Boey, F. Y. C., & Zhao, X. L. (2006). Novel synthesis of Al₂O₃ nano-particles by flame spray pyrolysis. *Journal of Materials Processing Technology*, 178(1–3), 270–273.
<https://doi.org/10.1016/j.jmatprotec.2006.04.007>
- Toto Rusianto. (2005). Studi Pengaruh Penambahan AL₂O₃ Dan Suhu Sinter Terhadap Kekerasan Dan Berat Jenis Relatif Pada Aluminium Serbuk (AL MMC).
- Van Vlack, L. H., (1985). *Elements of Material Science and Engineering*. Erlangga, Jakarta.
- Widyaastuti, Eddy S Siradj, Dedi Priadi, Anne Zulfia. (2008). Kompaktibilitas Komposit Isotropik Al/Al₂O₃ Dengan Variabel Waktu Tahan Sinter. *Makara, Sains*, Volume 12, No. 2, November 2008: 113-119.
- Zlaticanin, B., Radonjic, B., & Filipovic, M. (2004). Characterization of Structure and Properties of As-cast AlCuMg Alloys. *Materials Transactions*.

LAMPIRAN

Lampiran 1 Tabel data pengujian

Tabel data pengujian nilai densitas

Kode Sampel	Massa	Volume	densitas aktual	densitas teoritis
SP1	5,665	2,443	2,318870242	2,983
SP2	5,874	2,412	2,435323383	2,996
SP3	5,517	2,295	2,403921569	2,983
SP4	5,455	2,169	2,514983864	2,996
SP5	5,63	2,119	2,656913639	2,983
SP6	5,772	2,117	2,726499764	2,996

Tabel data pengujian nilai porositas

Kode Sampel	Massa Kering	Massa Basah	m2-m1	(m2-m1)/m1	%	Porositas
	m1	m2				
SP1	5,195	5,686	0,491	0,094514	100	9,451
SP2	5,742	6,218	0,476	0,0828979	100	8,29
SP3	5,357	5,834	0,477	0,0890424	100	8,904
SP4	5,433	5,854	0,421	0,0774894	100	7,749
SP5	4,963	5,385	0,422	0,0850292	100	8,503
SP6	5,66	6,058	0,398	0,070318	100	7,032

Tabel data pengujian nilai kekerasan

Kode Sampel	Titik	Niliai	Rata"		Kode Sampel	Titik	Niliai	Rata"
SP1	1	50,6	50,6		SP4	1	50,6	59,6
	2	50,5				2	60,9	
	3	50,8				3	67,5	
SP2	1	48,9	57,7		SP5	1	50,6	54,5
	2	55,3				2	58,5	
	3	69				3	54,6	
SP3	1	46,1	53,9		SP6	1	57,8	62,9
	2	58,8				2	63,1	
	3	56,9				3	67,8	

Tabel data pengujian laju aus

PENGUJIAN 1

Kode Sampel	massa awal m0	massa akhir m1	m0-m1	2	3,14 (π)	R	N	t (menit)	densitas sp	$2\pi RN_p$	$\frac{(m0 - m1)}{2\pi RNtp} \times 1000$	Laju Aus	
SP1	5,195	5,174	0,021	2	3,14	0,05	51,4	1	2,318	37,4116	0,000561	1000	0,561323
SP2	5,742	5,723	0,019	2	3,14	0,05	51,4	1	2,435	39,2999	0,000483	1000	0,483461
SP3	5,357	5,338	0,019	2	3,14	0,05	51,4	1	2,403	38,7835	0,00049	1000	0,4899
SP4	5,433	5,416	0,017	2	3,14	0,05	51,4	1	2,514	40,575	0,000419	1000	0,418978
SP5	4,963	4,946	0,017	2	3,14	0,05	51,4	1	2,656	42,8668	0,000397	1000	0,396578
SP6	5,66	5,645	0,015	2	3,14	0,05	51,4	1	2,726	43,9965	0,000341	1000	0,340936

PENGUJIAN 2

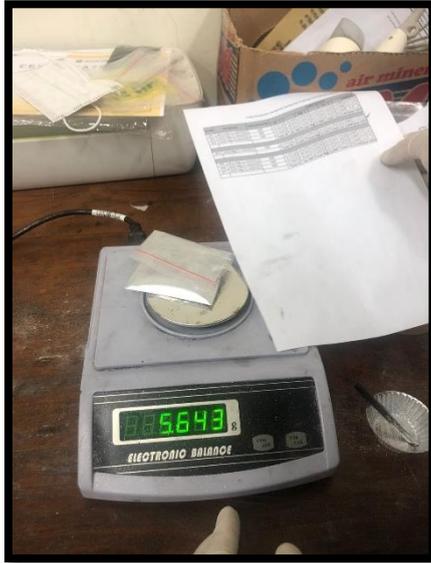
Kode Sampel	massa awal m0	massa akhir m1	m0-m1	2	3,14 (π)	R	N	t (menit)	densitas sp	$2\pi RN_p$	$\frac{(m0 - m1)}{2\pi RNtp} \times 1000$	Laju Aus	
SP1	3,586	3,57	0,016	2	3,14	0,05	51,4	1	2,318	37,4116	0,000428	1000	0,427675
SP2	5,622	5,599	0,023	2	3,14	0,05	51,4	1	2,435	39,2999	0,000585	1000	0,585243
SP3	3,814	3,797	0,017	2	3,14	0,05	51,4	1	2,403	38,7835	0,000438	1000	0,438331
SP4	4,877	4,855	0,022	2	3,14	0,05	51,4	1	2,514	40,575	0,000542	1000	0,542206
SP5	4,553	4,541	0,012	2	3,14	0,05	51,4	1	2,656	42,8668	0,00028	1000	0,279937
SP6	4,825	4,817	0,008	2	3,14	0,05	51,4	1	2,726	43,9965	0,000182	1000	0,181832

PENGUJIAN 3

Kode Sampel	massa awal m0	massa akhir m1	m0-m1	2	3,14 (π)	R	N	t (menit)	densitas sp	$2\pi RN_p$	$\frac{(m0 - m1)}{2\pi RNtp} \times 1000$	Laju Aus	
SP1	3,57	3,54	0,03	2	3,14	0,05	51,4	1	2,318	37,4116	0,000802	1000	0,80189
SP2	5,599	5,577	0,022	2	3,14	0,05	51,4	1	2,435	39,2999	0,00056	1000	0,559797
SP3	3,797	3,781	0,016	2	3,14	0,05	51,4	1	2,403	38,7835	0,000413	1000	0,412547
SP4	4,855	4,838	0,017	2	3,14	0,05	51,4	1	2,514	40,575	0,000419	1000	0,418978
SP5	4,541	4,529	0,012	2	3,14	0,05	51,4	1	2,656	42,8668	0,00028	1000	0,279937
SP6	4,817	4,809	0,008	2	3,14	0,05	51,4	1	2,726	43,9965	0,000182	1000	0,181832

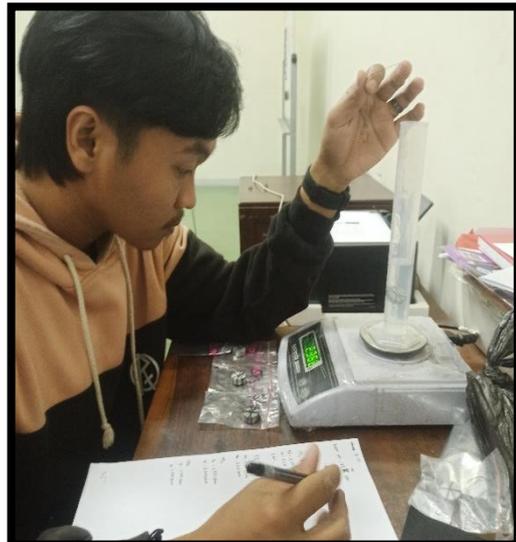
Lampiran 2 Dokumentasi kegiatan penelitian

Gambar A.1 Proses pembuatan spesimen

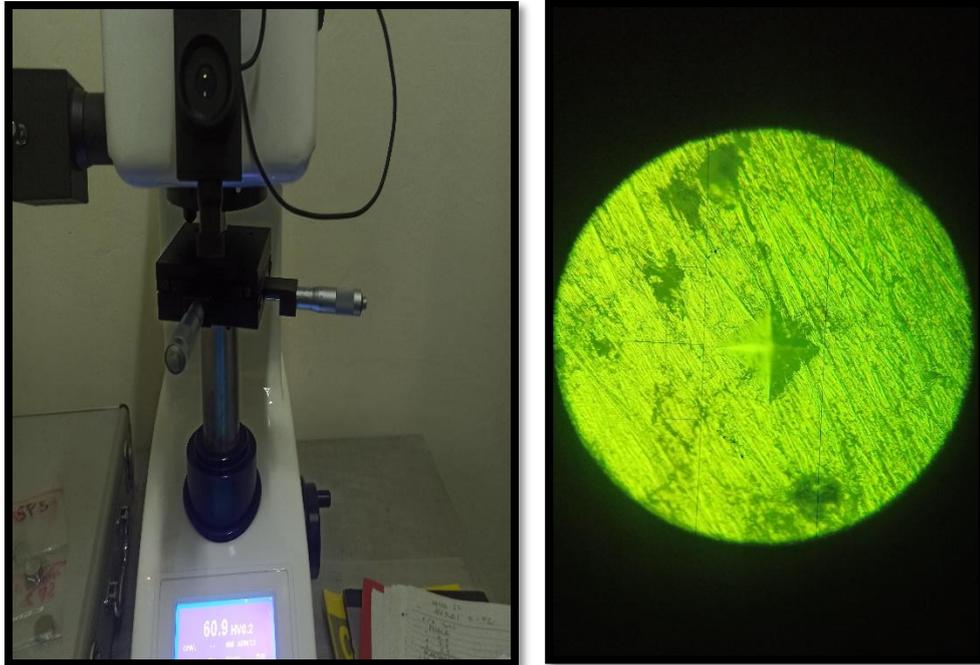




Gambar A.2 Pengujian Densitas dan Porositas



Gambar A.3 Pengujian Kekerasan

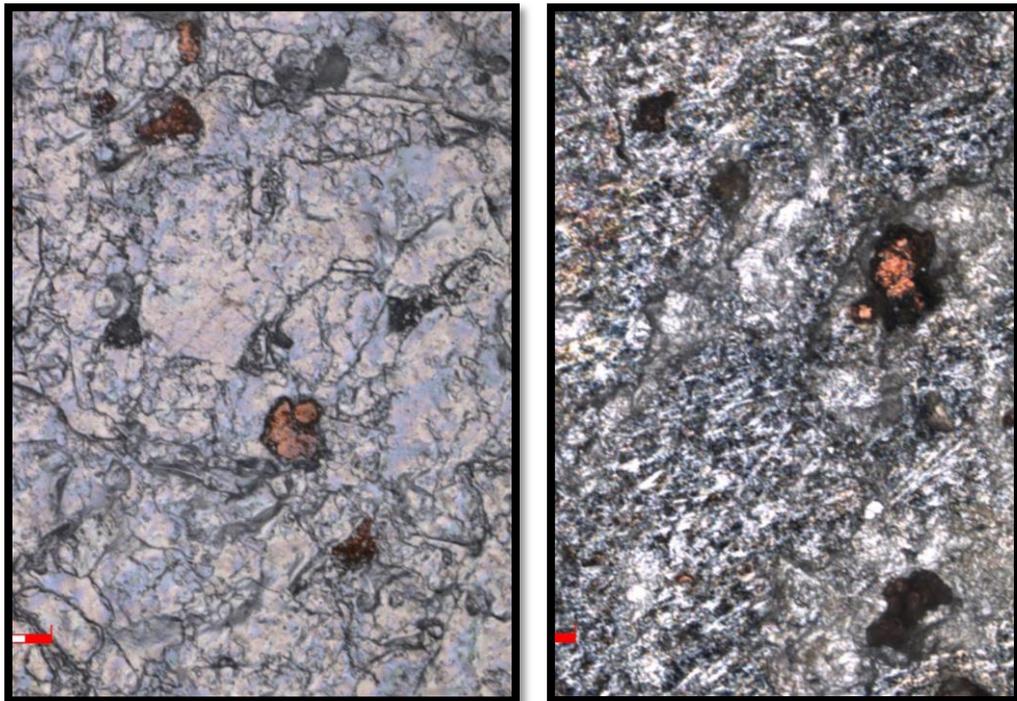


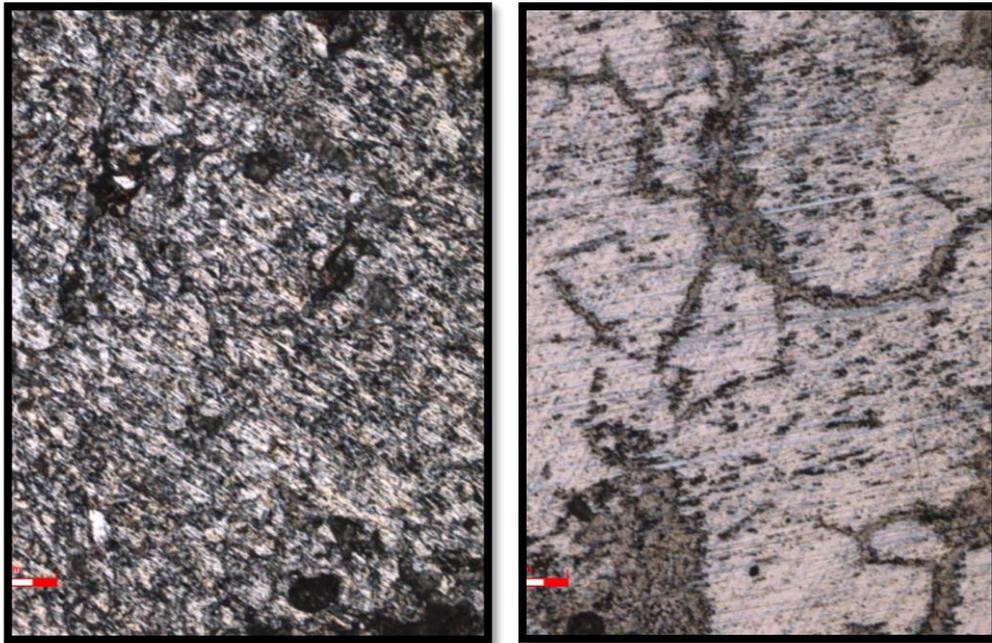
Gambar A.4 Pengujian Keausan





Gambar A.5 Pengamatan Metalografi





Gambar A.6 Pengujian SEM

