UNIVERSITAS GADJAH MADA
Ekstrusi Dan Karakterisasi Polimer Ultra-High Molecular Weight Polyethylene (UHMWPE) Untuk Bahan Baku 3D-Printing Berbasis Fused Deposition Modeling
CANDRA IRAWAN, Ir. Muslim Mahardika, S.T., M.Eng., Ph.D., IPM., ASEAN.Eng.; Dr. Budi Arifvianto, S.T., M.Biotec
Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Afrianta, M. F., Mahardika, M., & Arifvianto, B. (2020). *Pengaruh Temperatur Ekstrusi Dan Orientasi Raster Terhadap Ketahanan Impak Polylactic Acid (PLA) Yang Diproduksi Dengan Proses Fused Deposition Modelling (FDM)*. Universitas Gadjah Mada.

Alam, F., Choosri, M., Gupta, T. K., Varadarajan, K. M., Choi, D., & Kumar, S. (2019). Electrical, mechanical and thermal properties of graphene nanoplatelets reinforced UHMWPE nanocomposites. *Materials Science and Engineering B: Solid-State Materials for Advanced Technology*, *241*(February), 82–91. https://doi.org/10.1016/j.mseb.2019.02.011

Arifvianto, B., Leeflang, M. A., & Zhou, J. (2017). Diametral compression behavior of biomedical titanium scaffolds with open, interconnected pores prepared with the space holder method. *Journal of the Mechanical Behavior of Biomedical Materials*, *68*(December 2016), 144–154. https://doi.org/10.1016/j.jmbbm.2017.01.046

ASTM International. (2000). Standard Test Method for Tensile Strength and Young's Modulus for High-Modulus Single-Filament Materials. *System*, *75*(Reapproved 1989), 1–5.

ASTM International. (2016). Standard Test Method for Tensile Properties of Plastics. *ASTM International*, *82*(C), 1–15.

Balani, K., Verma, V., Agarwal, A., & Narayan, R. (2015). *Biosurfaces: A Materials Science and Engineering Perspective*. Hoboken, New Jersey.: John Wiley & Sons, Inc.

Bikas, H., Stavropoulos, P., & Chryssolouris, G. (2016). Additive manufacturing methods and modeling approaches: A critical review. *International Journal of Advanced Manufacturing Technology*, *83*(1–4), 389–405. https://doi.org/10.1007/s00170-015-7576-2

Bourell, D. L. (2016). Perspectives on Additive Manufacturing. *Annual Review of Materials Research*, *46*(January), 1–18. https://doi.org/10.1146/annurev-matsci-070115-031606

Callister, W. D. (2006). *Materials Science and Engineering : An Introduction*. John Wiley & Sons, Inc.

Catauro, M., Scolaro, C., Dal Poggetto, G., Pacifico, S., & Visco, A. (2020). Wear

UNIVERSITAS GADJAH MADA
Ekstrusi Dan Karakterisasi Polimer Ultra-High Molecular Weight Polyethylene (UHMWPE) Untuk Bahan Baku 3D-Printing Berbasis Fused Deposition Modeling
CANDRA IRAWAN, Ir. Muslim Mahardika, S.T., M.Eng., Ph.D., IPM., ASEAN.Eng.; Dr. Budi Arifvianto, S.T., M.Biotec
Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

resistant nanocomposites based on biomedical grade UHMWPE paraffin oil and carbon nano-filler: Preliminary biocompatibility and antibacterial activity investigation. *Polymers*, *12*(4). https://doi.org/10.3390/POLYM12040978

Cheng, J., Yang, X., Dong, L., Yuan, Z., Wang, W., Wu, S., … Wang, H. (2017). Effective nondestructive evaluations on UHMWPE/Recycled-PA6 blends using FTIR imaging and dynamic mechanical analysis. *Polymer Testing*, *59*, 371–376. https://doi.org/10.1016/j.polymertesting.2017.02.021

Dontsov, Y. V., Panin, S. V., Buslovich, D. G., & Berto, F. (2020). *Taguchi Optimization of Parameters for Feedstock Fabrication and FDM Manufacturing of Wear-Resistant UHMWPE-Based Composites*. *13*(2718). https://doi.org/10.3390/ma13122718

Fang, L. M., Gao, P., & Cao, X. W. (2011). Temperature window effect and its application in extrusion of ultrahigh molecular weight polyethylene. *Express Polymer Letters*, *5*(8), 674–684. https://doi.org/10.3144/expresspolymlett.2011.66

Feng, Y., Gao, Y., Chen, J., Jiang, J., Yin, X., He, G., … Qu, J. (2019). Properties of compression molded ultra-high molecular weight polyethylene products pretreated by eccentric rotor extrusion. *Polymer International*, *68*(5), 862–870. https://doi.org/10.1002/pi.5775

Flowers, P., Theopold, K., Langley, R., J., E. N., & Robinson, W. R. (2019). *Atoms First 2e*. Houston, Texas: Openstax.

Gaget, L. (2019). Answer the largest survey of the 3D printing industry! Diambil 29 September 2019, dari https://www.sculpteo.com/blog/2019/02/12/answer-the-largest-survey-of-the-3d-printing-industry/

Grieser, F. (2019). FDM and SLA Simply Explained. Diambil 21 Desember 2020, dari https://all3dp.com/fdm-vs-sla/

Haddadi, S. A., Ahmad, A. R., Amini, M., & Kheradmand, A. (2018). In-situ preparation and characterization of ultra-high molecular weight polyethylene/diamond nanocomposites using Bi-supported Ziegler-Natta catalyst: Effect of nanodiamond silanization. *Materials Today Communications*, *14*, 53–64. https://doi.org/10.1016/j.mtcomm.2017.12.011

High Density Polyethylene. (n.d.). Diambil 1 Februari 2021, dari http://wwwcourses.sens.buffalo.edu/ce435/Polyethylene/CE435Kevin.htm

I. Gibson, D. W. Rosen, B. S. (2015). Rapid Prototyping to Direct Digital Manufacturing. In *Additive Manufacturing Technologies*.

UNIVERSITAS
GADJAH MADA
Ekstrusi Dan Karakterisasi Polimer Ultra-High Molecular Weight Polyethylene (UHMWPE) Untuk Bahan
Baku 3D-Printing Berbasis Fused Deposition Modeling
CANDRA IRAWAN, Ir. Muslim Mahardika, S.T., M.Eng., Ph.D., IPM., ASEAN.Eng.; Dr. Budi Arifvianto, S.T., M.Biotec
Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

Jang, H.-J., Shin, C. Y., & Kim, K.-B. (2015). Safety Evaluation of Polyethylene Glycol (PEG) Compounds for Cosmetic Use. *Toxicological Research*, *31*(2), 105–136. https://doi.org/10.5487/TR.2015.31.2.105

Kalsoom, U., Nesterenko, P. N., & Paull, B. (2016). Recent developments in 3D printable composite materials. *RSC Advances*, *6*(65), 60355–60371. https://doi.org/10.1039/c6ra11334f

Khairuddin, Pramono, E., Utomo, S. B., Wulandari, V., Zahrotul, A. W., & Clegg, F. (2016). FTIR studies on the effect of concentration of polyethylene glycol on polimerization of Shellac. *Journal of Physics: Conference Series*, *776*(1). https://doi.org/10.1088/1742-6596/776/1/012053

Kurtz, S. M. (2016). *Ultra-High Molecular Weight Polyethylene in Total Joint Replacement and Medical Devices* (Third Edit). United States: Matthew Deans.

Kurtz, S. M., Mazzucco, D., Rimnac, C. M., & Schroeder, D. (2006). Anisotropy and oxidative resistance of highly crosslinked UHMWPE after deformation processing by solid-state ram extrusion. *Biomaterials*, *27*(1), 24–34. https://doi.org/10.1016/j.biomaterials.2005.05.102

Lee, H. C., Gaire, J., Currlin, S. W., McDermott, M. D., Park, K., & Otto, K. J. (2017). Foreign body response to intracortical microelectrodes is not altered with dip-coating of polyethylene glycol (PEG). *Frontiers in Neuroscience*, *11*(SEP), 1–11. https://doi.org/10.3389/fnins.2017.00513

Li, W., Li, R., Li, C., Chen, Z.-R., & Zhang, L. (2015). Mechanical Properties of Surface-Modified Ultra-High Molecular Weight Polyethylene Fiber Reinforced Natural Rubber Composites. *Polymer Composites*. https://doi.org/10.1002/pc.23685

Li, Y., He, H., Ma, Y., Geng, Y., & Tan, J. (2019). Rheological and mechanical properties of ultrahigh molecular weight polyethylene/high density polyethylene/polyethylene glycol blends. *Advanced Industrial and Engineering Polymer Research*, *2*(1), 51–60. https://doi.org/10.1016/j.aiepr.2018.08.004

Mourad, A. H. I., Greish, Y. E., & Ayad, O. G. (2019). Processing and Mechanical Performance of Hydroxyapatite-UHMWPE Composites. *2019 Advances in Science and Engineering Technology International Conferences, ASET 2019*, 1–5. https://doi.org/10.1109/ICASET.2019.8714487

Nandiyanto, A. B. D., Oktiani, R., & Ragadhita, R. (2019). How to read and interpret ftir spectroscope of organic material. *Indonesian Journal of Science and*

UNIVERSITAS GADJAH MADA
Ekstrusi Dan Karakterisasi Polimer Ultra-High Molecular Weight Polyethylene (UHMWPE) Untuk Bahan Baku 3D-Printing Berbasis Fused Deposition Modeling
CANDRA IRAWAN, Ir. Muslim Mahardika, S.T., M.Eng., Ph.D., IPM., ASEAN.Eng.; Dr. Budi Arifvianto, S.T., M.Biotec
Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

Technology, *4*(1), 97–118. https://doi.org/10.17509/ijost.v4i1.15806

Okubo, H., Kaneyasu, H., Kimura, T., Phanthong, P., & Yao, S. (2021). *Effects of a Twin-Screw Extruder Equipped with a Molten Resin Reservoir on the Mechanical Properties and Microstructure of Recycled Waste Plastic Polyethylene Pellet Moldings*. *13*(1058). https://doi.org/https://doi.org/10.3390/ polym13071058

Osswald, T. A., & Hernández-Ortiz, J. P. (2006). Polymer processing : Modeling and Simulation. In *Hanser Gardner Publications*.

Pang, W., Ni, Z., Chen, G., Huang, G., Huang, H., & Zhao, Y. (2015). Mechanical and thermal properties of graphene oxide/ultrahigh molecular weight polyethylene nanocomposites. *RSC Advances*, *5*(77), 63063–63072. https://doi.org/10.1039/c5ra11826c

Ramadhan, A. I., Diniardi, E., & Daroji, M. (2017). Analisa Penyusutan Produk Plastik di Proses Injection Molding Menggunakan Media Pendingin Cooling Tower dan Udara dengan Material Polypropylene. *Jrst: Jurnal Riset Sains Dan Teknologi*, *1*(2), 65. https://doi.org/10.30595/jrst.v1i2.1577

Ramli, M. S., Wahab, M. S., Ahmad, M., & Bala, A. S. (2016). FDM preparation of bio-compatible UHMWPE polymer for artificial implant. *ARPN Journal of Engineering and Applied Sciences*, *11*(8), 5474–5480.

Ramya, A., & Vanapalli, S. L. (2016). 3D printing technologies in various applications. *International Journal of Mechanical Engineering and Technology*, *7*(3), 396–409.

Rocha, M., Mansur, A., & Mansur, H. (2009). Characterization and Accelerated Ageing of UHMWPE Used in Orthopedic Prosthesis by Peroxide. *Materials*, *2*(2), 562–576. https://doi.org/10.3390/ma2020562

Rogers, W. J. (2012). Sterilisation techniques for polymers. In *Sterilisation of Biomaterials and Medical Devices*. https://doi.org/10.1533/9780857096265.151

Rowe, R. C., Sheskey, P. J., & Quinn, M. E. (2009). Handbook of Pharmaceutical Excipients. In *Revue des Nouvelles Technologies de l'Information* (Sixth). London: Pharmaceutical Press.

Roy, R. K. (2010). *A Primer On The Taguchi Method* (2 ed.). Michigan, USA: SME.

Rufino Senra, M., & Vieira Marques, M. de F. (2020). Thermal and mechanical behavior of ultra-high molecular weight polyethylene/collagen blends. *Journal of the Mechanical Behavior of Biomedical Materials*, *103*(November 2019). https://doi.org/10.1016/j.jmbbm.2019.103577

Sánchez-Sánchez, X., Hernández-Avila, M., Elizalde, L. E., Martínez, O., Ferrer, I., &

UNIVERSITAS
GADJAH MADA
**Ekstrusi Dan Karakterisasi Polimer Ultra-High Molecular Weight Polyethylene (UHMWPE) Untuk Bahan
Baku 3D-Printing Berbasis Fused Deposition Modeling**
CANDRA IRAWAN, Ir. Muslim Mahardika, S.T., M.Eng., Ph.D., IPM., ASEAN.Eng.; Dr. Budi Arifvianto, S.T., M.Biotec
Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

Elías-Zuñiga, A. (2017). Micro injection molding processing of UHMWPE using ultrasonic vibration energy. *Materials and Design*, *132*, 1–12. https://doi.org/10.1016/j.matdes.2017.06.055

Sastranegara, A. (2009). Mengenal Uji Tarik dan Sifat-sifat Mekanik Logam. Diambil 28 September 2020, dari http://www.infometrik.com/2009/09/mengenal-uji-tarik-dan-sifat-sifat-mekanik-logam/

Satiti, B. E., Mahardika, M., & Arifvianto, B. (2020). *Mechanical Properties Of Fused Deposition Modelling (FDM)-Printed PLA/TPU Multimaterial*. Universitas Gadjah Mada.

Strong, A. B. (2006). *Plastics: Materials and Processing*. Printice Hall.

Sui, G., Zhong, W. H., Ren, X., Wang, X. Q., & Yang, X. P. (2009). Structure, mechanical properties and friction behavior of UHMWPE/HDPE/carbon nanofibers. *Materials Chemistry and Physics*, *115*(1), 404–412. https://doi.org/10.1016/j.matchemphys.2008.12.016

Veronese, F. M., & Pasut, G. (2005). PEGylation, successful approach to drug delivery. *Drug Discovery Today*, *10*(21), 1451–1458. https://doi.org/10.1016/S1359-6446(05)03575-0

Waddon, A. J., & Keller, A. (1990). A temperature window of extrudability and reduced flow resistance in high-molecular weight polyethylene; interpretation in terms of flow-induced mobile hexagonal phase. *Journal of Polymer Science Part B: Polymer Physics*, *28*(7), 1063–1073. https://doi.org/10.1002/polb.1990.090280706

Xie, M., & Li, H. (2007). Viscosity reduction and disentanglement in ultrahigh molecular weight polyethylene melt: Effect of blending with polypropylene and poly(ethylene glycol). *European Polymer Journal*, *43*(8), 3480–3487. https://doi.org/10.1016/j.eurpolymj.2007.05.016

Xie, M., Liu, X., & Li, H. (2006). Influence of poly(ethylene glycol)-containing additives on extrusion of ultrahigh molecular weight polyethylene/polypropylene blend. *Journal of Applied Polymer Science*, *100*(2), 1282–1288. https://doi.org/10.1002/app.23510

Xiong, L., & Xiong, D. (2012). The influence of irradiation dose on mechanical properties and wear resistance of molded and extruded ultra high molecular weight polyethylene. *Journal of the Mechanical Behavior of Biomedical Materials*, *9*, 73–82. https://doi.org/10.1016/j.jmbbm.2012.01.002

UNIVERSITAS
GADJAH MADA
Ekstrusi Dan Karakterisasi Polimer Ultra-High Molecular Weight Polyethylene (UHMWPE) Untuk Bahan Baku 3D-Printing Berbasis Fused Deposition Modeling
CANDRA IRAWAN, Ir. Muslim Mahardika, S.T., M.Eng., Ph.D., IPM., ASEAN.Eng.; Dr. Budi Arifvianto, S.T., M.Biotec
Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

Yousef, S., Visco, A., Galtieri, G., Nocita, D., & Espro, C. (2017). Wear behaviour of UHMWPE reinforced by carbon nanofiller and paraffin oil for joint replacement. *Materials Science and Engineering C*, *73*, 234–244. https://doi.org/10.1016/j.msec.2016.11.088

Yuniarto, K., Purwanto, Y. A., Purwanto, S., Welt, B. A., Purwadaria, H. K., & Sunarti, T. C. (2016). Infrared and Raman studies on polylactide acid and polyethylene glycol-400 blend. *AIP Conference Proceedings*, *1725*. https://doi.org/10.1063/1.4945555

Zhang, H., & Liang, Y. (2018). Extrusion Processing of Ultra-High Molecular Weight Polyethylene. *Extrusion of Metals, Polymers and Food Products*. https://doi.org/10.5772/intechopen.72212

Zhang, L., Lu, C., Dong, P., Wang, K., & Zhang, Q. (2019). Realizing mechanically reinforced all-polyethylene material by dispersing UHMWPE via high-speed shear extrusion. *Polymer*, *180*(July), 121711. https://doi.org/10.1016/j.polymer.2019.121711