

Review of Doctoral Thesis

1. PhD candidate
Ing. Jan Jaros / E-mail
2. Name of PhD programme
Name
3. Title of PhD thesis
RESEARCH AND DEVELOPMENT OF ADDITIVELY MANUFACTURED LATTICE STRUCTURES
4. Principal supervisor
doc. Ing. Daniel Koutný, Ph.D. / daniel.koutny@vut.cz
5. Co-supervisor
Title and name of co-supervisor / E-mail
6. Reviewer
Bartłomiej Adam Wysocki, Ph.D. Eng. / b.wysocki@uksw.edu.pl
Cardinal Stefan Wyszyński University in Warsaw, Multidisciplinary Research Centre
7. Overview of the scope of PhD thesis¹
Very good
<p>The doctoral thesis of Ing. Jan Jaroš, supervised by doc. Ing. Daniel Koutný, Ph.D., is a cumulative thesis, also known as a thesis by publications. It begins with an introduction that discusses Powder Bed Fusion using Laser Beam technology (PBF-LB), focusing specifically on the literature regarding the production of cellular structures from aluminium and magnesium alloys using this technique. The literature review highlights a significant gap: there is currently no established methodology for precisely optimising the PBF-LB process for creating cellular structures from aluminium and magnesium. This review precedes the articulation of the thesis's objectives, which are presented as three scientific questions and corresponding research hypotheses. Ing. Jan Jaroš addresses these questions and hypotheses in three scientific articles published in high-impact journals. He is the first author of two articles and the second author of one, contributing over 50% to all publications. The research methods employed in the doctoral thesis are presented in a dedicated chapter before the reprints of the scientific articles. The collection of articles concludes with answers to the research questions and hypotheses. Analysis of the results indicated that the first and second hypotheses cannot be refuted; notably, the contour strategy has a positive impact on porosity reduction, allowing to produce a WE43 alloy with a theoretical density exceeding 99%. However, the third hypothesis was refuted, demonstrating that the contour strategy does not provide greater strength than the commonly used hatch strategy with skywriting. The thesis concludes with a bibliography that includes 110 references, as well as lists of figures, tables, and abbreviations/symbols.</p>

¹ Overview of the scope of PhD thesis is a short description of objectives of PhD thesis's research and summary of main findings and scientific achievements.

8. Significance of the topic and clarity of problem statement

Very good

Selecting process parameters for the PBF-LB (Powder Bed Fusion-Laser Beam) method, particularly for cellular structures with small beams/struts (less than 3 mm), is a critical area of research from an industrial perspective. A significant challenge in this field is the processing of lightweight aluminium (e.g., AlSi10Mg) and magnesium (e.g., WE43) alloys. In his dissertation, Ing. Jan Jaroš effectively outlined the issue of selecting appropriate PBF-LB process parameters for these materials. Ing. Jan Jaroš rightly emphasises that magnesium alloys are particularly challenging to process using PBF-LB technology due to their flammability and narrow melting range (650°C) and boiling point (1107°C). Furthermore, he notices that analysing essential PBF-LB process parameters, such as laser power and scanning speed, along with scanning strategies that consider the distance between scan lines, is vital for achieving defect-free cellular structures that will exhibit high mechanical properties. This critical research topic has been validated by the doctoral student through the publication of his findings in three reputable scientific journals. I believe this work holds significant value, especially since PBF-LB device manufacturers typically provide customers with processing parameters for AlSi10Mg alloys primarily for thicker objects—generally those with wall thicknesses exceeding several millimetres. They often leave it to the customer to determine the appropriate PBF-LB process parameters for components with thinner walls or smaller beam/strut sizes. In the case of magnesium alloys, most manufacturers do not offer processing parameters and often advise against their use due to the risks associated with flammability and the considerable smoke produced during the process, which can impair proper laser beam focusing.

9. Knowledge of existing literature

Good

Ing. Jan Jaroš demonstrates a high level of knowledge of current literature, as evidenced by the research questions and hypotheses he has formulated. The "state of the art" section of his doctoral dissertation includes up-to-date information from publications concerning the selection of parameters for the powder bed fusion using laser beam (PBF-LB) process, which enables the production of defect-free objects and maximises their potential for subsequent industrial applications. The literature review in his work effectively presents key PBF-LB process parameters and their interrelationships, as well as the possibilities for producing cellular structures and how these parameters influence selected properties. His analysis provides a detailed examination of the impact of PBF-LB process parameters on surface quality, dimensional accuracy, scanning strategies, and mechanical properties. Additionally, the dissertation addresses the current state of knowledge regarding the processing of aluminium and magnesium alloys. However, the section on aluminium alloys is relatively brief, which I consider a significant oversight, as numerous publications detailing the production of cellular structures from the AlSi10Mg alloy should be discussed in greater depth. Furthermore, the discussion on scanning strategies could be enhanced by including the impact of additional remeltings on reducing defects. It would also be beneficial to incorporate a discussion of alternative scanning strategies, such as single-point exposure scanning, developed by Professor A.A. Zadpoor and his group, which are particularly intriguing in the context of producing struts/bars with diameters of several hundred micrometres.

10. Choice of methods and technical soundness

Very good

The research methods employed in Ing. Jan Jaroš's dissertation align with current trends in the production and material characterisation of objects additively manufactured from metals using the PBF-LB process.

Test samples were produced using a Nikon/SLM Solutions 280, which is a production machine recognised in the industry. Conducting research on optimising PBF-LB parameters on production equipment is beneficial, as it facilitates the transfer of results into industrial practice. However, the large dimensions of the working chamber of this kind of equipment present challenges for sample optimisation and require a greater amount of input materials. The production of research samples, starting from single welds and thin-walled objects to cellular structures, along with the characterisation methods employed, adheres to established practices in the field of additive manufacturing. Material characterisation was conducted through metallographic preparation, micro-computed tomography, and measurements of CAD model accuracy and surface roughness. These techniques yielded results that either clearly confirm or refute the hypotheses proposed in this study. Additionally, the mechanical tests and computer simulations (both mechanical tests and thermal distribution) performed significantly enhanced the scientific value of the dissertation.

11. Quality, originality and significance of the results

Very good

The doctoral thesis presents original and high-quality results regarding the optimisation of producing thin-walled and cellular structures from aluminium and magnesium alloys using the Powder Bed Fusion using Laser Beam (PBF-LB) process. The findings significantly contribute to the current body of knowledge, as evidenced by their publication in three reputable journals with high impact factors. The developed parameters can be utilised in production practices because they are supported by tests carried out on a mass-scale production device. However, the introduction of the thesis could have benefited from a chapter discussing potential applications, apart from medical, for cellular structures from aluminium and magnesium alloys produced with the high precision presented in the dissertation. In my opinion, the brief information on the potential use of these magnesium structures for medical applications, such as scaffolds, is insufficient. Transferring research results to the industry in the form of lattice structures for medical applications poses significant challenges, particularly with the certification of bioresorbable materials. Research on controlling the release of magnesium ions into the human body is still in its early stages, suggesting that the practical applications of these structures may not be the necessary solutions in medicine in the near future.

12. Quality of attached papers

Very good

The journals that published the research results are among the most respected and recognised in the fields of mechanical and materials engineering, as well as in additive manufacturing processes for metals. "Advanced Engineering Materials" and the "Journal of Manufacturing Processes" are particularly esteemed within these disciplines, and having research results published in these journals—which have undergone rigorous peer review—is undoubtedly a significant achievement for any scientist. While MDPI journals may not be as highly regarded as those from Wiley or SME, I believe it is still valuable to publish results there if we aim to be the first in the world to showcase our achievements. The articles underwent thorough review; however, I did notice a few typographical errors in figure numbering and wording. Nevertheless, these issues do not detract from the overall reception of the presented results.

13. Overall assessment, strengths and weaknesses (based upon the above evaluation categories 8–12)

Very good

I evaluate this work very good, particularly emphasising "very." A significant strength of this research lies in the extensive investigation of numerous samples acquired through various PBF-LB process parameters, including laser power, scanning speeds, and scanning strategies. The characterisation of the resulting materials is executed through metallographic examination, tomographic assessments of CAD model accuracy, and roughness analysis, adhering to established best practices within the engineering discipline. However, a notable limitation of the work is the absence of discussion, albeit briefly mentioned in the introduction, regarding the potential for constructing cellular structures through alternative scanning strategies, such as single-point exposure scanning. Furthermore, a deeper exploration of the feasibility of employing additional remelting techniques, in which a single layer is additionally remelted, utilising the same or a completely different scanning strategy, would be beneficial. Also, in my opinion, the dissertation should include a plan for future research in the summary. I believe that a comprehensive characterisation of the phase composition through X-ray diffraction (XRD) methods, along with microscopic observations utilising techniques such as Transmission Electron Microscopy (TEM/HRTEM) or Scanning Electron Microscopy/Electron Backscatter Diffraction (SEM/EBSD), would significantly enhance the understanding of microstructural changes in materials produced via diverse scanning strategies. Regardless of these comments, I would like to emphasise that the work is outstanding, and the results contained therein are certainly of interest to the broader scientific and industrial community.

14. Questions and comments

Questions and additional comments will be presented at the public hearing.

15. Conclusion

PhD thesis is an independent scientific work that presents a novel solution to a significant problem in the research area and demonstrates the candidate's ability to conduct independent research.

YES

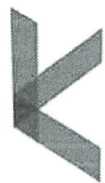
16. Date and signature

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Please note

- A. Evaluate categories 7 to 13 using the following scale: unacceptable, acceptable, satisfactory, good, very good, excellent. The qualification of 'excellent' should only be given for a PhD Thesis in the top 3% of the research in your field of expertise.
- B. E-mail the completed form to: Klara.Javorcekova@vut.cz



Faculty of Mechanical Engineering
Brno University of Technology

Review of Doctoral Thesis

1. PhD candidate

Ing. Jan Jaroš / Jan.Jaros2@vut.cz

2. Name of PhD programme

Design and Process Engineering

3. Title of PhD thesis

Research and development of additively manufactured lattice structures

4. Principal supervisor

doc. Ing. Daniel Koutný, Ph.D. / Daniel.Koutny@vut.cz

5. Co-supervisor

6. Reviewer

Dr.techn. Fernando Gustavo Warchomicka / fernando.warchomicka@tugraz.at

Graz University of Technology

7. Overview of the scope of PhD thesis¹

Very good

Following an exhaustive review and critical analysis of the existing literature, the candidate identified significant knowledge gaps that guided the definition of the thesis objectives. Accordingly, the work was structured around three scientific questions about the application of laser contour strategies. The main focus is the utilization of this technique to improve the fabrication of lattice structures in magnesium alloys. His research activities involve optimizing the technique to evaluate the influence of laser strategies on geometry, surface quality, and microstructural defects in aluminium alloys. Insights gained from this work provide the foundation for exploring the fabrication of complex structures in magnesium alloys. The chosen methodology is suitable for advancing the technological aspects of the process. However, limited understanding remains regarding the effect of laser strategies on microstructural features, which are closely linked to mechanical performance.

8. Significance of the topic and clarity of problem statement

Excellent

This work highlights the significance of Laser Powder Bed Fusion (LPBF) technology for the fabrication of complex geometries, such as lattice structures. Such architectures are highly relevant for lightweight

¹ Overview of the scope of PhD thesis is a short description of objectives of PhD thesis's research and summary of main findings and scientific achievements.



design in transportation and biomedical applications, as they provide an excellent strength-to-weight ratio. However, the use of LPBF to magnesium alloys remains mostly challenging, since the production of degradation-controlled components with high mechanical stability is a condition for their use as temporary implants. The candidate identifies the problems reported in the literature (Chapter 3) and employs them as a basis for understanding and improving the technique. The main research questions and hypotheses are clearly formulated, and the objectives of the thesis are well defined and measurable (Chapter 4). Overall, the topic demonstrates strong technological relevance, and the problem statement is articulated with satisfactory clarity to support a research strategy.

9. Knowledge of existing literature

Very good

The candidate provides a well-structured summary of the existing literature concerning process parameters, heat dissipation, and laser strategies for additive manufacturing, with particular emphasis on their influence on the fabrication of lattice structures. In addition, the literature research overviews the studied materials, with special focus on the processing of magnesium alloys. This summary enables the candidate to identify the main challenges and limitations related to the production of lattice structures and to derive the scientific questions addressed in the thesis. The discussion of mechanical properties and microstructural features is comparatively less developed, which may be attributed to the thesis's emphasis on optimizing defect-free structural components.

10. Choice of methods and technical soundness

Excellent

The methodology employed in this thesis is presented in Chapter 5, where the stages of investigation are clearly structured and complemented by a graphical overview of the workflow. The description of the laser strategies, the different types of investigated samples (single weld tracks, thin walls, struts, and cells), as well as the characterization procedures applied to the manufactured components, is specific and well organized. This systematic presentation demonstrates that the choice of methods is appropriate for reaching the research objectives. An additional strength lies in the addition of scientific articles into the thesis, which provides specific details regarding the characterization techniques, including roughness evaluation, 2D/3D observations, compression testing, and simulation. This approach enhances the reproducibility of the methodology, allowing comparable results to be achieved by other researchers. However, the characterization of the microstructure, WE43 alloy, is less developed. A deeper investigation into the relationship between microstructural features and observed defects would have further strengthened the analysis. In particular, Paper III includes images that could be more carefully exploited to draw conclusions about local chemical composition, distribution of phases in critical parts of the cells or mechanical property variations as a function of the applied laser strategy.

11. Quality, originality and significance of the results

Very good

The results presented in this thesis reflect a high quality of experimental and analytical work, employing multiple techniques of characterization to improve the technological understanding of lattice structures manufacturing. The use of micro-computed tomography (μ CT) for the different laser strategies and process parameter led to achieve a comprehensive analysis of the defect's formation during manufacturing. Measurement of geometry accuracy and surface roughness provided further insights about the importance of the laser strategy in the final shape of the lattice structure. The originality of these studies is given by their systematic investigation and optimization of various laser strategies (contour,



hatch, skywriting, and their combinations) specifically tailored for low-volume, complex lattice geometries. A significant contribution was achieved in the processing of AlSi10Mg alloy, where the influence of contour strategy and input energy on process stability and component quality was clearly demonstrated. Furthermore, a novel contribution in the field of WE 43 alloy is the finding that the hatch strategy with skywriting is most effective in reducing defects and controlling the Young's modulus to values lower than those for the same material in bulk condition. However, the potential to investigate the relationship between microstructure and mechanical properties was not fully exploited, which could have further strengthened the scientific impact of the work.

12. Quality of attached papers

Very good

These articles collectively examine the Laser Powder Bed Fusion process, specifically focusing on its application in manufacturing lattice structures for various industries application. As highlighted in points 10 and 11, the selected characterization methodology, combined with the systematic experimental approach and analysis demonstrated in the articles included in the thesis, provides substantial information and valuable new insights. Paper I has achieved notable visibility within the scientific community, building upon and extending the results of a related study published in Materials in 2018 (<https://doi.org/10.3390/ma11091763>) This work refines the understanding of the LPBF process and introduces new types of structure to strengthen the analysis. Papers II and III focus on the production of lattice structures and unit cells, examining the influence of laser strategies and their combination on optimizing geometric accuracy and minimizing defect formation during the processing of magnesium alloys. The use of the well-known WE43 alloy facilitates parameter selection and enables the extension of the investigation not only in the processing window (geometries, combination of strategies, energy, etc) but also for similar alloys in the future.

13. Overall assessment, strengths and weaknesses (based upon the above evaluation categories 8–12)

Very good

In general, the overall performance shown in the thesis is very good. He clearly prepared the problem statement and the scientific questions to determine the main findings through the chosen methodology. The research is primarily technological in nature but provides important contributions to the scientific community, independent of the material system studied. The principal strengths of the work include the conceptual formulation, the comprehensive methodology employed for characterization, and the thorough analysis and interpretation of the results. These elements enabled an effective optimization of the process and meaningful correlations with the existing literature. The main weaknesses of the thesis can be identified as follows: 1) The metallographic characterization remains relatively superficial, limiting the understanding of the potential influence of microstructural features on defect formation and mechanical performance. 2) A general discussion that synthesizes the findings across the different papers and know-how of the process is lacking. The candidate presented results and discussion for each paper separately (Chapter 6), but a more integrated discussion would have strengthened the coherence and impact of the thesis.

14. Questions and comments

Comments: 1) A general discussion of the work is missing. It would have been valuable to highlight the advantages and limitations of the investigated process, particularly in comparison with other techniques currently employed for the production of lattice structures. 2) Metallographic analysis is essential for magnesium alloys. While the optimization of lattice structures and reduction of defects is important, the



possible evaporation of alloying elements, heat dissipation and thermal cycling during processing can significantly affect phase distribution, and thereby influence both the mechanical performance and the corrosion behaviour of the component. 3) For future theses, it is recommended that the author's individual contribution be clearly specified in cases where the work has been carried out in co-authorship. In Paper I, the candidate reports a 51% contribution; however, the specific activities are not measurable. 4) caption of Figure 2-17 is not provided in English. Questions: Mechanical Testing: 1) Did you check the fracture surface of compressed lattice? 2) Chapter 8. Other results: What does it mean?

15. Conclusion

PhD thesis is an independent scientific work that presents a novel solution to a significant problem in the research area and demonstrates the candidate's ability to conduct independent research.

YES

16. Date and signature

19/08/2025

Please note

- A. Evaluate categories 7 to 13 using the following scale: unacceptable, acceptable, satisfactory, good, very good, excellent. The qualification of 'excellent' should only be given for a PhD Thesis in the top 3% of the research in your field of expertise.
- B. E-mail the completed form to: Klara.Javorcekkova@vut.cz



Principal supervisor's final report on the PhD study

1. PhD candidate
Jan Jaroš / Jan.Jaros2@vut.cz
2. Name of PhD programme
Design and Process Engineering
3. Title of PhD thesis
Research and Development of Additively Manufactured Lattice Structures
4. Principal supervisor
Assoc. prof. Ing. Daniel Koutný, Ph.D. / Daniel.Koutny@vut.cz
5. Co-supervisor
- / -
6. Stays at other institutions (min. 7 days)
Technische Universität Wien/ Austria / 01/02/2024 / 15/07/2024
7. Teaching activities
CAD / 286 hrs Design and CAD / 156 hrs CAD Modeling / 44 hrs Project management / 80 hrs 3D Digital Technology and CAD / 10 hrs Additive Technologies / 9 hrs
8. List of main publications
Papers published in journals with impact factor: JAROŠ, J.; OŽVOLDÍK, D.; VAVERKA, O.; NOPOVÁ, K.; HURNÍK, J.; ZIKMUND, T.; KAISER, J.; KOUTNÝ, D. Influence of Laser Strategies on Performance of Lattice Structures from Magnesium Alloy WE43 Produced by Laser Beam Powder Bed Fusion. <i>Advanced Engineering Materials</i> , 2025, vol. 27, no. 7, ISSN: 1527-2648. <i>Journal impact factor = 3.3, Quartile Q2, Citations = 0</i> JAROŠ, J.; VAVERKA, O.; SENCK, S.; KOUTNÝ, D. Influence of Process Energy on the Formation of Imperfections in Body-Centered Cubic Cells with Struts in the Vertical Orientation Produced by Laser Powder Bed Fusion from the Magnesium Alloy WE43. <i>Micromachines</i> , 2024, vol. 15, no. 2, ISSN: 2072-666X. <i>Journal impact factor = 3.0, Quartile Q2, Citations = 1</i>

VAVERKA, O.; ČERVINEK, O.; JAROŠ, J.; KOUTNÝ, D.; PANTĚLEJEV, L. Numerical and Experimental Evaluation of Structured Material for Use in Multi-scale Topology Optimization. *Advanced Engineering Materials*, 2024, vol. 26, no. 13, ISSN: 1527-2648.

Journal impact factor = 3.3, Quartile Q2, Citations = 1

MINÁRIK, P.; ZEMKOVÁ, M.; ŠAŠEK, S.; DITTRICH, J.; KNAPEK, M.; LUKÁČ, F.; KOUTNÝ, D.; JAROŠ, J.; KRÁL, R. Comparative analysis of microstructure, mechanical, and corrosion properties of biodegradable Mg-3Y alloy prepared by selective laser melting and spark plasma sintering. *Journal of Magnesium and Alloys*, 2024, vol. 12, no. 4, pp. 1496-1510. ISSN: 2213-9567.

Journal impact factor = 13.8, Quartile Q1, Citations = 4

JAROŠ, J.; KOUTNÝ, D.; KLAUKURKOVÁ, L.; GNEIGER, S.; SENCK, S. Ultrasonic atomization of magnesium alloy AZ61 based on the TIG melting method. *Journal of Mechanical Science and Technology*, 2023, vol. 37, no. 10, ISSN: 1976-3824.

Journal impact factor = 1.5, Quartile Q3, Citations = 0

NOPOVÁ, K.; JAROŠ, J.; ČERVINEK, O.; PANTĚLEJEV, L.; GNEIGER, S.; SENCK, S.; KOUTNÝ, D. Processing of AZ91D Magnesium Alloy by Laser Powder Bed Fusion. *Applied Sciences - Basel*, 2023, vol. 13, no. 1, ISSN: 2076-3417.

Journal impact factor = 2.5, Quartile Q3, Citations = 11

SLAVIČEK, J.; FRANKE, J.; JAROŠ, J.; KOUTNÝ, D. Strategies for wire arc additive manufacturing of thin walls and overhangs. *Journal of Mechanical Science and Technology*, 2023, vol. 37, no. 1, pp. 5529-5534. ISSN: 1738-494X.

Journal impact factor = 1.5, Quartile Q3, Citations = 5

VRÁNA, R.; JAROŠ, J.; KOUTNÝ, D.; NOSEK, J.; ZIKMUND, T.; KAISER, J.; PALOUŠEK, D. Contour laser strategy and its benefits for lattice structure manufacturing by selective laser melting technology. *Journal of Manufacturing Processes*, 2022, vol. 74, no. 1, pp. 640-657. ISSN: 1526-6125.

Journal impact factor = 6.2, Quartile Q2, Citations = 33

VRÁNA, R.; KOUTNÝ, D.; PALOUŠEK, D.; PANTĚLEJEV, L.; JAROŠ, J.; ZIKMUND, T.; KAISER, J. Selective Laser Melting Strategy for Fabrication of Thin Struts Usable in Lattice Structures. *Materials*, 2018, vol. 11, no. 9, pp. 1-20. ISSN: 1996-1944.

Journal impact factor = 2.972, Quartile Q2, Citations = 34

Papers in conference proceedings:

JAROŠ, J.; DUCHOŇ, M.; VÍCHA, D.; PCHÁLEK, V.; ŠVÁB, Č.; KOUTNÝ, D. TiAl6V4 bistable mechanism produced by Laser Powder Bed Fusion. Aachen, Germany: Metal Additive Manufacturing Conference 2024, Poster session.

9. Assessment of the supervision process

Very good

Justification for evaluation: The main communication with the doctoral student regarding the topic of his thesis was carried out in the form of regular meetings on weekly bases. More detailed discussions of the topic of the dissertation, including planned experiments, partial results and proposals for further steps, then took place approximately every four to six months. The student also actively discussed specific topics of prepared studies with and other experts in the materials characterisation field. Throughout the course of the study, communication went smoothly, and certain disruptions and slowdowns in activities only occurred during the COVID-19 pandemic.



10. Assessment of the candidate's ability to work independently

Very good

Justification for evaluation: The doctoral student proved his ability to work independently. From the beginning of the studies, he participated in several research projects. The tasks he received were done on time and in a good quality. He proved to be capable to guide student projects and bachelor thesis. Student prepared and solved two faculty internal projects, one for the additive technologies course and second for his PhD topic. During the third and fourth year, he prepared and solved intra faculty research project. During the project, he showed that he is able to independently plan experiments, evaluate the results and prepare final research reports. The student also demonstrated the ability to formulate hypotheses on his own research and test them with experiments he designed. During his studies, he initiated cooperation with researchers from other faculties at the university.

11. Assessment of the contribution that the research makes to knowledge in the field

Very good

The dissertation advances the state of knowledge on PBF-LB production of lattice structures by systematically addressing imperfections and mechanical limitations previously insufficiently described in the literature. First, it demonstrated that using the contour strategy for AlSi10Mg struts enables relative material densities above 99.8% with superior surface quality and dimensional accuracy compared to standard hatch strategies. Second, it achieved for the first time relative densities up to 99.96% in WE43 magnesium alloy lattice cells with diameters of 0.5–1 mm, thereby overcoming key processing challenges of this difficult material. Importantly, the research revealed the sensitivity of larger struts to irregular pores and quantified the influence of weld overlap and alloy thermal properties. Finally, the work identified optimal laser strategies for entire WE43 lattice structures, showing that a combination of contour and hatch, or hatch with skywriting, reduces pore formation and enhances mechanical performance, yielding a Young's modulus up to 40 GPa. These results provide new insights into the relationship between process parameters, geometry, and material response, and deliver practical guidelines for producing high-quality magnesium lattices. The thesis thus establishes a foundation for lightweight and biodegradable applications, notably in biomedical and aerospace fields, where no comparable data had previously been available.

12. Other comments

Project on which student participated or led during his PhD studies:
2023 – 2028, MEBioSys – Mechanical Engineering of biological and bioinspired systems, CZ.02.01.01/00/22_008/0004634, Ministry of Education, Youth and Sports, team member
2022 – 2025, BAANG - HORIZON-WIDERA-2021-ACCESS-03, ID 101079091, Building Actions in Smart Aviation with Environmental Gains, team member
2021 – 2024, TAČR FW03010160 – TREND, Surface treatment of very thin structures realized by 3D metal additive manufacturing, team member
2020-2022, ATCZ229, Research of magnesium alloys for additive manufacturing of structural and biomedical parts, team member
2017-2020, ESA Contract no. 4000123317/18/NL/GLC/hh, Additive Design for Aerospace Applications Capabilities (ADAAC), team member
2023 – 2024, CEITEC VUT/FSI-J-23-8433, Porosity of micro-rod structures manufactured by SLM technology from biodegradable magnesium alloy WE43 with focus on cell node, co-investigator
2022, FV22-08, Development of process parameters of contour strategy for the production of micro-rod structures made of magnesium alloy WE43 by Selective Laser Melting technology, project leader
2020-2021, MPO FV20232, Structural biodegradable implants processing by means of direct metal laser sintering, team member



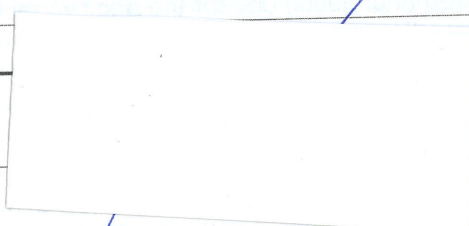
13. Conclusion

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YES

14. Date and signature

29/08/2025



Please note

- A. Evaluate categories 9 to 11 using the following scale: unacceptable, acceptable, satisfactory, good, very good, excellent.
- B. In each category 9 to 11 explain reasons for evaluation using between 100–200 words.
- C. E-mail the completed form to: Klara.Javorcekova@vut.cz