

Agreement number 2023-1-RO01-KA220-HED-000155412

European Network for Additive Manufacturing in Industrial Design for Ukrainian Context



National University of Science and Technology POLITEHNICA Bucharest

Assoc. Prof. Dr. Eng. Băilă Diana-Irinel
University POLITEHNICA of Bucharest, Romania
Faculty of Industrial Engineering and Robotics





Agreement number 2023-1-RO01-KA220-HED-000155412

European Network for Additive Manufacturing in Industrial Design for Ukrainian Context – Acronym AMAZE

Project Partners:

- 1- National University of Science and Technology Politehnica Bucharest Project Coordinator: Assoc.Prof. Diana Băilă
- 2- Yuriy Fedkovych Chernivtsi National University (Ukraine) Mr. Dean Prof. Igor Fodchuk
- 3- Poznan University of Technology (Poland) Project Responsible Mr. Prof. Remigiusz Labudzki
- 4- Edibon International S.A. (Spain) Project Responsible Mrs Myrian Judit Bonilla











Co-funded by the European Union

Erasmus+ Programme Key Action 2 Cooperation Partnerships for Higher Education (KA220-HED)

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Ana Blandiana (Romanian poet)

– The bouquet of flowers











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Summer School – Bucharest- **8-17 July 2024** Dracula Castle – Bran, Romania











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Summer School – Bucharest- **8-17 July 2024** Peleş Castle – Sinaia, Romania











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Summer School –
Bucharest- **8-17 July 2024**Black Sea











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Summer School – Bucharest- 8-17 July 2024

Casa Poporului, Bucharest, Romania Castelul Kretulescu, Bucharest, Romania















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National University of Science and Technology POLITEHNICA Bucharest (UNSTPB) is the oldest and most prestigious engineer school in Romania.

At present the University **POLITEHNICA** of Bucharest is formed by 15 different faculties.

Most faculties are equipped with 3d printers that used FDM, DLP and SLA technologies.

In the Campus research center of University POLITEHNICA of Bucharest is the best performing 3d bioprinter from Romania.

www.upb.ro











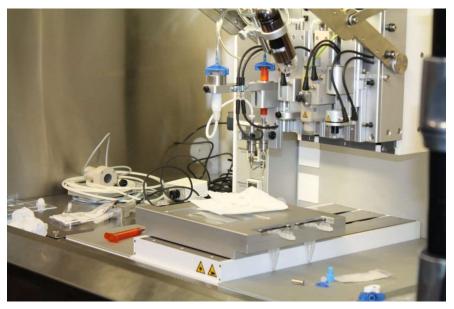
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Firma ZSpot Media – RegenHU 3D Discovery





https://www.bioprintere.ro/bioimprimanta-3d-performanta-universitatea-politehnica-bucuresti/http://campus.pub.ro/website/fluide-nanostructures-and-soft-nanomaterials











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Instruments, objects printed, 5 heads for bioprinting



https://www.bioprintere.ro/bioimprimanta-3d-performanta-universitatea-politehnica-bucuresti/











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3D Printers that will be used in AMAZE Project - University POLITEHNICA of Bucharest



Hybrid 3D Printer Zmorph 2.0 SX Full SET - FDM (Fused Deposition Modeling)



Photocentric Liquid Crystal - DLP (Digital Light Processing)



Phenix Systems – PXS&PXM - DMLS (Direct Metal Laser Sintering) – collaborating company)











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National University of Science and Technology <u>Politehnica</u> of Bucharest, Hosts Kick off Meeting for Erasmus+ project for university cooperation.

Erasmus+ Programme, Key Action 2 Cooperation Partnerships for Higher Education (KA220-HED)

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On this occasion, we invite professors, researchers, students from UNSTPB and from other institutions to the <u>Kick.off</u> Meeting.

The event will take place between November 27-29, 2023, at the UNSTPB Central Library, floor II, room 2.3, starting at 09.00.









Kick off Meeting – Transnational Project Meeting TPM1 – UNSTPB Bucharest, 27-29 nov 2023

The dissemination of the event on the website:

https://upb.ro/unstpb-anunta-lansarea-proiectului-international-erasmus-european-network-for-additive-manufacturing-in-industrial-design-for-ukrainian-context-amaze/

upb.ro/unstpb-anunta-lansarea-proiectului-international-erasmus-european-network-for-additive-manufacturing-in-industrial-design-for-ukrainian-context-amaze/



UNSTPB anunță Iansarea Proiectului International Erasmus + - European Network for Additive Manufacturing in Industrial Design for Ukrainian Context -

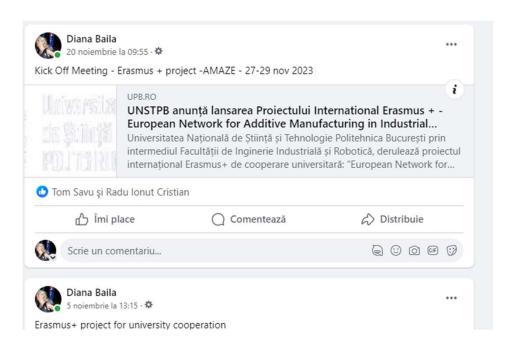




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European Network for Additive Manufacturing in Industrial Design for Ukrainian Context





Kick off Meeting – Transnational Project Meeting TPM1 – UNSTPB Bucharest, 27-29 nov 2023

The dissemination of the event on the facebook:

https://upb.ro/unstpb-anunta-lansarea-proiectuluiinternational-erasmus-european-network-for-additivemanufacturing-in-industrial-design-for-ukrainian-contextamaze/











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Erasmus+ Programme Key Action 2 Cooperation Partnerships for Higher Education (KA220-HED)

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Kick off Meeting – Transnational Project Meeting TPM1 – UNSTPB Bucharest, 27-29 nov 2023





Project Agenda:





Programme in Romania Financed by Erasmus+

2023 Cooperation Projects in Higher Education Area (KA220-HED)

AMAZE - European Network for Additive Manufacturing in Industrial Design for Ukrainian

Context, contract pp., 2023-1-RO01-KA220-HED-000155412

Transnational Project Meeting - TPM 1

KICK-OFF MEETING hosted by National University of Science and Technology
Politehnica Bucharest - UNSTPB

27th - 29th of November 2023 - Bucharest/ROMANIA

Monday 27th November - Room 2.3, Central Library - UNSTPB, starting at 9:00

Partners presentation

- 1. Information/Bilateral contracts
 - 1.1 Information from National Agency
 - 1.2 Contracts and annexes
- 2. Project management:
 - 2.1 Eligibility of the staff members involved in the project (hiring issues)
 - 2.2 Collection of activity reporting by the coordinator: organization and calendar (timesheets)

10:30 - 10:45 Coffee break

- 2.3 Role of the leaders of Intellectual Outputs
- 2.4 Tools (Microsoft Teams, WhatsApp group)
- 2.5 Validation of the distribution of tasks Each partner will present the plan for each activity they have ownership Part 1
- 2.6 Calendar of the project/deadlines/milestones

13:00 - 14:00 Lunch

- 2.9 State of progress of the production of the Intellectual Outputs
- 2.10 Validation of the distribution of tasks Each partner will present the plan
- for each activity they have ownership Part 2
- 2.11 Laboratory visit.

16:00 End of the session

Tuesday 28th of November - Room 2.3, Central Library - UNSTPB, starting at 9:00

- 3. Mobilities project
 - 3.1 Short-term joint staff training: who? which dates?
 - 3.2 Intensive Programmes for higher education students: who? which dates?

10:30 - 10:45 Coffee break

- 3.3 Communication in our institutions / How to involve colleagues in the project
- 3.4 Calendar of the next events
- 3.5 Evaluation of the project

13:00 - 14:00 Lunch

- 3.6 Mutual presentation for new incomers in the meeting
- 3.7 Validation of the distribution of tasks Each partner will present the plan for each activity they have ownership – Part3.
- 3.8 Laboratory visit

16:00 End of the session

Wednesday 29th of November - Research Center CAMPUS - UNSTPB, starting at 9:00

- 4.1 Partners experience in Industrial Design/3D printing: general feedback
- 4.2 Conclusions
- 4.3 Laboratory visit
- 11:30 End of the Transnational Project Meeting.

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Dissemination







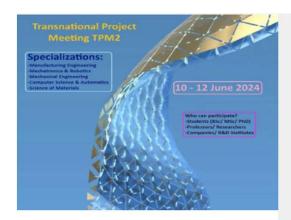


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Project activities- www.amaze2023.eu



To come ...

2nd Transnational Project Meeting

Poznan, Poland 10 -12 Jun 2024

Flyer



To come ...

2nd Multiplier Event

Bucharest, Romania 18 Jun 2024

Flyer



To come ...

3rd Multiplier Event

Chernivtsi, Ukraine 20 Jun 2024

Flyer











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Project activities- www.amaze2023.eu



To come ...

Summer School

Bucharest, Romania 8 - 17 Jul 2024

Flyer

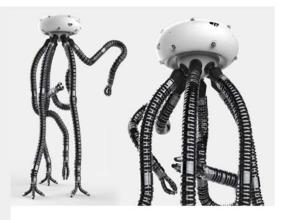


To come ...

3rd Transnational Project Meeting

Madrid, Spain 4 - 6 Sep 2024

Flyer



To come...

4th Multiplier Event

Poznan, Poland 4 Nov 2024

Flyer











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Kick off Meeting – Transnational Project Meeting TPM1 – UNSTPB Bucharest, 27-29 nov 2023

Project Results:

Results: What project results and other outcomes do you expect your project to have?

The project will achieve the following results: IO1 – AMAZE e-book for developing of complex design industrial parts, IO2 – AMAZE e-toolkit manual for digital learning in producing of complex design industrial parts, IO3 – AMAZE e-learning VR/AR platform, IO4 – AMAZE e-case studies.

- 1 open acces book
- -1 open acces toolkit manual
- -2 academic papers (in journals with high visibility, open-acces) and 2 papers in International Conference open-acces and 1 patent submitting application.









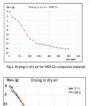


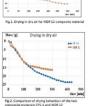
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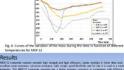












AMAZE Project Results

Project Results: 2 articles accepted for publishing in **International Conferences**

- BRAMAT 2024, Brasov, Romania, 13-16 March 2024
- KreativEU 2024, Targoviste, Romania, 16-17 may 2024

Acceptance Notification



Diana Irinel Băilă Igor Fodchuk Remigiusz Łabudzki Myrian Bonilla

ACCURACY OF SLA AND MATERIAL MORPHOLOGY USED IN ARCHITECTURE











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Project Budget

Expenditure	Grant (Euro)
1, Project management and implementation	23978
2. Short term transnational mobility activities of in	d 40382
3 Intelectual outputs	43040.00
4, Multiplier events	12600
5. Special needs	0
6, Exceptional costs	0
Total requested from EEA Grants 2014-2021	120000.00











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Kick off Meeting – Transnational Project Meeting TPM1 – UNSTPB Bucharest, 27-29 nov 2023

Project workpackages:

IO1 - AMAZE e-book for developing of complex design industrial parts (15.11.2023 – 14.03.2024) – Leading organisation - UNSTPB

IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts (15.03.2024 – 14.06.2024)

– Leading organisation CHNU

IO3 - AMAZE e-learning VR/AR platform for virtual laboratory (15.06.2024 – 14.09.2024) - Leading organisation Edibon International S.A.

- AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models) (15.09.2024-14.11.2024) – Leading organisation PUT

Project Management and Dissemination Results (15.11.2023 – 14.11.2024)











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Kick off Meeting – Transnational Project Meeting TPM1 – UNSTPB Bucharest, 27-29 nov 2023

Project workpackages:

IO1 - AMAZE e-book for developing of complex design industrial parts (15.11.2023 – 14.03.2024) – Leading organisation – UNSTPB

comprising the next module courses:

- 1-Additive Manufacturing (UPB); UPB
- 2-Smart (Intelligent) Materials (YFCNU+PUT); YFCNU
- 3-CAD/CAM/CAE design (YFCNU);
- 4- Reverse Engineering (PUT);
- 5-Computer Programming (Edibon);
- 6-Sensors and Electronics (UPB); UPB
- 7-Virtual Reality/Augmented Reality (Edibon)

Multiplier EVENT ME1 -1 day (40 persons from different companies and 8 foreigners) – EDIBON International S.A. – 25th April 2024











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Project workpackages:

IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts (15.03.2024 – 14.06.2024) – Leading

organisation CHNU

comprising the next toolkit modules:

- 1-Additive Manufacturing (UNSTPB);
- 2-Smart (Intelligent) Materials (YFCNU+PUT);
- 3-CAD/CAM/CAE design (YFCNU);
- 4- Reverse Engineering (PUT);
- 5-Computer Programming (Edibon);
- 6-Sensors and Electronics (UNSTPB);
- 7-Virtual Reality/Augmented Reality (Edibon)

Multiplier Events:

ME2 – 1 day hosted by UNSTPB (ROM) (20 persons out from UNSTPB) and 18 June 2024

ME3 – 1 day hosted by YFCNU (UKR) (20 persons from outside of university) – 20 june 2024

Training staff feedbacks EDIBON (SP) during 4 days, participating from each partner institution 4 persons (in total 16 persons) – 7 may –

12 may 2024

For TPM2 –hosted by PUT (POL) will participate 2 staff, professors, key persons by each institution involved in project (Total 8 pers) and

others - 3 days (10 - 12 June 2024)











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Project workpackages:

IO3 - AMAZE e-learning VR/AR platform for virtual laboratory (15.06.2024 – 14.09.2024) - Leading organisation Edibon International S.A.

Summer School feedbacks given by students and staffs involved in AMAZE project – UNSTPB – 10 days (staffs and students) – 8-17 July 2024

TPM3 (3 days), hosted by Edibon company (8 persons – 2 persons/institution) – 4-6 sep 2024











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Kick off Meeting – Transnational Project Meeting TPM1 – UNSTPB Bucharest, 27-29 nov 2023

Project workpackages:

O4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models) (15.09.2024-14.11.2024) – Leading organisation PUT

Multiplier Event ME4 realized at PUT (POL), having invited 20 persons from different companies, universities, research centers (out of PUT) and 5 foreigner's participants – 4 nov 2024











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HUMAN RESOURCES - UNSTPB

Researchers

- Prof.Habil.Dr.Eng. IONESCU Nicolae -FIIR
- > Prof.Dr.Eng. SAVU Tom FIIR
- Prof.Dr.Eng. DUMITRESCU Andrei FIIR
- Prof.Dr.Eng. ZAHARIA Cătălin
 Dep Bioresources and Polymer Science
- ➤ Assoc.Prof.Dr.Eng. GHIONEA Gabriel -lonuṭ Faculty IIR
- ➤ <u>Lect.Dr.Eng</u>. Radu Ionuţ-Cristian Dep Bioresources and Polymer Science
- Drd.Eng. JUGRAVU Bogdan-Alexandru Faculty IIR
- Drd. Eng. TRUŞCĂ Roxana Doina
- > Dr. Eng. NICOARĂ Adrian Ionuț
- Cs. Dr. VASILE Otilia Ruxandra





Assoc.Prof.Dr.Eng. BĂILĂ Diana-Irinel – Project Coordinator Faculty IIR



- Ec. CĂLDĂRUŞ Florina Financial <u>Responsible</u> Rectorat
- Ec. DIACONU Nicoleta <u>Salary</u> Financial Responsible Rectorat
- Ec. PĂTRAȘCU Nicoleta- Responsible for human resources
 Rectorat













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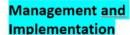


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Researchers

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- Prof.Dr.Eng. ZAHARIA CătălinDep Bioresources and Polymer Science
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Dissemination Results

SLS – material PA12

FDM – PEEK, PLA, PLA Silk Rainbow, PLA Silk Like Kingfisher Rainbow Colours (Silicone properties)

DLP, SLA – biocompatible photopolymer resins

DMLS/SLM - Ti6Al4V, superalloys INCONEL and Co-Cr

Analysis Test recommended for the materials used for the components:

SEM (Scanning Electron Microscopy)

TEM (Transmission Electron Microscopy)

EDAX (Energy Dispersive X-ray Analysis)

XRD (X-Ray Diffraction)

FTIR (Fourier Transform Infrared Spectroscopy)

RAMAN (Raman Spectroscopy)

AFM (Atomic Force Microscopy)

Contact angle test

Mechanical tests









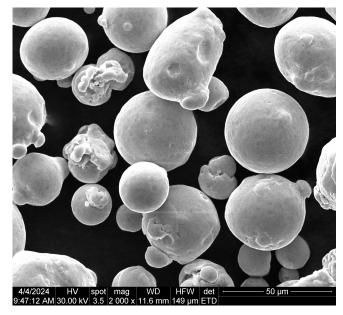


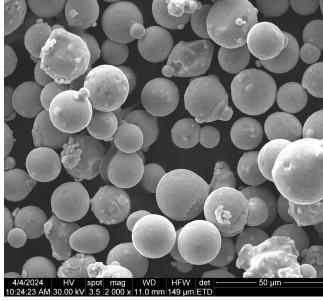
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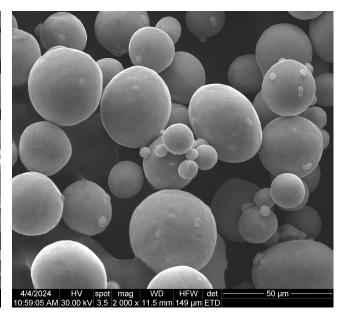
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Metallic powders used in SLM (SELECTIVE LASER MELTING)







625 INCONEL 718 INCONEL Ti6Al4V









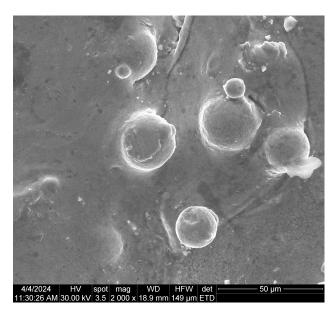


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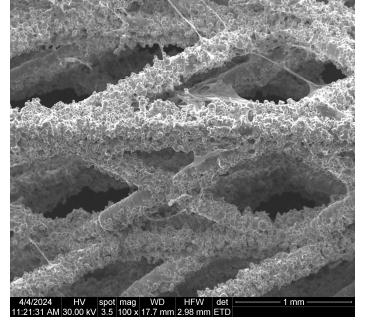
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Sintered parts used in SLM (SELECTIVE LASER MELTING)







Ti6Al4V









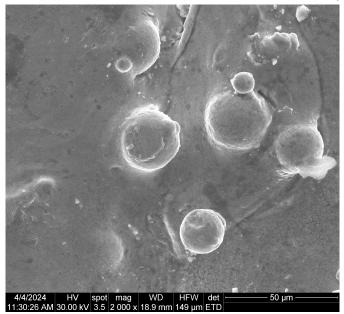


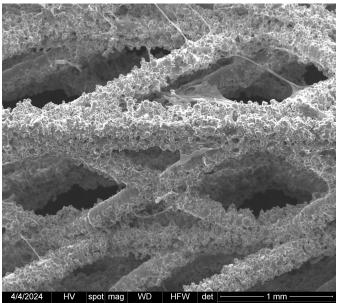
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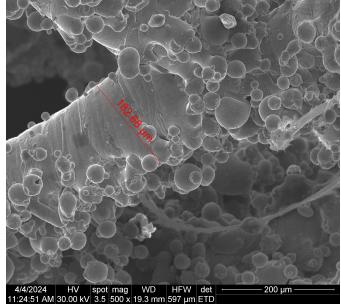
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Sintered parts used in SLM (SELECTIVE LASER MELTING)







625 INCONEL









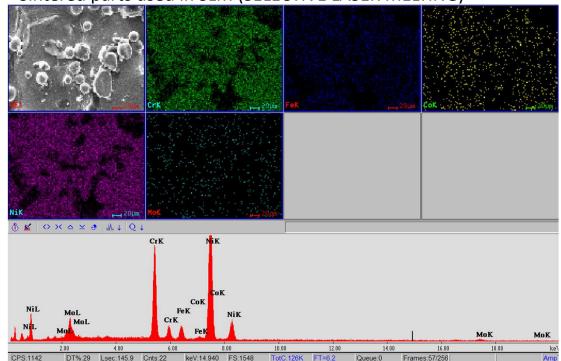


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Sintered parts used in SLM (SELECTIVE LASER MELTING)



625 INCONEL









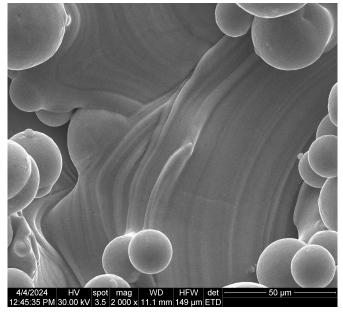


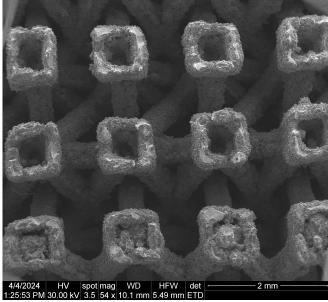
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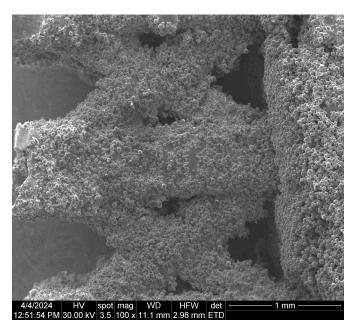
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Sintered parts used in SLM (SELECTIVE LASER MELTING)







Ti6Al4V







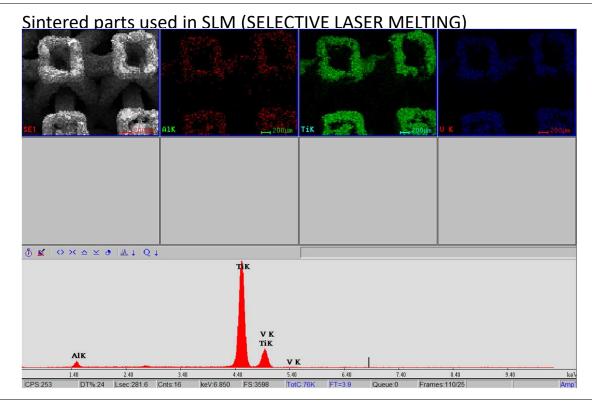




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Ti6Al4V











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AMAZE PROJECT - RESEARCH DIRECTIONS

This project will lead to the opening of new topics and research directions that will be capitalized in projects such as:

- ➤ HORIZON 2020
- > CORDIS EU
- > EEA GRANTS
- ➤ EUROSTARS (EUREKA)
- > TEMPUSV
- ➤ ERASMUS-MUNDUS ACTION3, etc.









