Development of ceramic and multi material components by additive manufacturing methods for personalized medical products

Résultats

Informations projet

CerAMfacturing

N° de convention de subvention: 678503

Site Web du projet

DOI
10.3030/678503

Projet clôturé

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30 Juillet 2015

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€ 5 121 799,50

Coordonné par
FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV
Germany

Ce projet apparaît dans...

CORDIS fournit des liens vers les livrables publics et les publications des projets HORIZON.

Les liens vers les livrables et les publications des projets du 7e PC, ainsi que les liens vers certains types de résultats spécifiques tels que les jeux de données et les logiciels, sont récupérés dynamiquement sur OpenAIRE.

Livrables

Demonstrators, pilots, prototypes (5)

Pilots of 2nd generation

Fully operative AM devices suited for multi material production of ceramic components and implementation of conventionally manufactured semi-components exist.

Jewelry component

Several ceramic watchcases combining black and white zirconia can be demonstrated and evaluated.

Individualised gripper for minimally invasive surgery

Different grippers with individualised geometry can be demonstrated and evaluated by practically relevant tests.

Pilots of 1st generation

A first generation of fully operative further developed AM devices for FDM, LCM and T3DP is ready to prepare testing parts by a multi material approach. This deliverable will be the technical basis for WP5 and WP6

Customised IR-heater

Customised IR limb heater can be demonstrated.

Documents, reports (14)

Validation of results

Characterisation results of green and sintered demonstrators from WP6

LCM suspensions for multi material approach

Suspension couples for LCM multi material approach are available. LCM suspensions for structural combinations of dense/porous or for differently coloured ceramic components or for the individualisation of conventionally manufactured semi-products exist. Material data for simulation (WP5) are measured.

Testing part for T3DP combined with conventional shaping routes

Testing component for the combination of a conventionally manufactured semi-component (e.g. ceramic injection moulded parts or green tapes) with T3DP is developed. Results of the investigations will be summarized in a lab-report.

Choice of materials, shaping routes and testing parts

The report will contain a market survey on ceramic AM technologies and feedstocks, the chosen materials and material combinations, the polymeric binders such as the chosen AM technologies and combinations of AM and conventional shaping routes, respectively.

Tailor binders for LCM suspensions and FDM/t3DP feedstocks

First tailored binder compositions for LCM suspensions and FDM/T3DP feedstocks are available

LCM multifunctional testing part

Testing components consisting of different structures (porous/dense) and different colours (black/white) are developed. Results of the investigations will be summarized in a lab-report.

Testing part for FDM combined with conventional shaping routes

Testing component for the combination of a conventionally manufactured semi-component (e.g. ceramic green tapes) with FDM is developed. Results of the investigations will be summarized in a lab-report.

Testing part for LCM combined with conventional shaping routes

Testing component for the combination of a conventionally manufactured semi-component (e.g. ceramic injection moulded parts or green tapes) with LCM is

developed. Results of the investigations will be summarized in a lab-report.

Multiscale simulation for FDM

A multi scale simulation approach is developed and verified with experimental results in a report.

Project progress report

Reports on the project progress with comparison of the planned and actual schedule will be delivered. It reports any deviations from the work plan and risks associated with the performed work and planned milestones. It provides further a status of cerAMfacturing financial status and its spending. Presented every half a year.

T3DP multi material testing part

Testing component for a ceramic material combination is developed. Depending on the decisions taken in WP2 the combination may concern either different colours or physically properties like electrical conductivity. Results of the investigations will be summarized in a lab-report.

FDM/T3DP feedstocks fur multi material approach

Feedstock couples for FDM and T3DP multi material approach are available. FDM and T3DP feedstocks for ceramic semi-components with different properties or for the individualisation of conventionally manufactured semi-products exist. Material data for simulation (WP5) are measured.

FDM multi material testing part

Testing component for the ceramic material combination electrically conductive/insulation is developed. Results of the investigations will be summarized in a lab-report.

Results of functional tests

Results of functionality tests on all the demonstrators

Websites, patent fillings, videos etc. (7)

Project Movie

A movie showing the objectives and results of the project to support the dissemination and raise interest in the broader public.

2nd Project Conference

Second project conference, presenting the final results of the project to invited organisations and experts.

Complete and Final Dissemination and Exploitation Plan
The complete and final dissemination and exploitation plan for the project. It is based on the first final version from month 12, after it was further developed in the project and based on the results.

Industrial Workshop
A workshop especially for interested industrial organisations to show the development in the AM field.

Final dissemination and exploitation plan
The final dissemination and exploitation plan for the project. It will be monitored and adjusted further during the project and exploitation plan will be further developed for the partners.

1st Project Conference
First project conference, presenting the first results of the project to invited organisations and experts.

Project Website
project website with a private and a public section

Publications

Peer reviewed articles (5)

Lithography-based ceramic manufacturing (LCM) – Viscosity and cleaning as two quality influencing steps in the process chain of printing green parts
Auteurs: E. Schwarzer, M. Götz, D. Markova, D. Stafford, U. Scheithauer, T. Moritz
Publié dans: Journal of the European Ceramic Society, Numéro 37/16, 2017, Page(s) 5329-5338, ISSN 0955-2219
Éditeur: Elsevier BV
DOI: 10.1016/j.jeurceramsoc.2017.05.046

Ceramic-Based 4D Components: Additive Manufacturing (AM) of Ceramic-Based Functionally Graded Materials (FGM) by Thermoplastic 3D Printing (T3DP)
Auteurs: Uwe Scheithauer, Steven Weingarten, Robert Johne, Eric Schwarzer, Johannes Abel, Hans-Jürgen Richter, Tassilo Moritz, Alexander Michaelis
Publié dans: Materials, Numéro 10/12, 2017, Page(s) 1368, ISSN 1996-1944

Éditeur: MDPI Open Access Publishing
DOI: 10.3390/ma10121368

Investigation of Droplet Deposition for Suspensions Usable for Thermoplastic 3D Printing (T3DP)
Auteurs: Uwe Scheithauer, Robert Johne, Steven Weingarten, Eric Schwarzer, Hans-Jürgen Richter, Tassilo Moritz, Alexander Michaelis
Publié dans: Journal of Materials Engineering and Performance, Numéro 27/1, 2018, Page(s) 44-51, ISSN 1059-9495
Éditeur: ASM International
DOI: 10.1007/s11665-017-2875-4

Thermoplastic 3D Printing-An Additive Manufacturing Method for Producing Dense Ceramics
Auteurs: Uwe Scheithauer, Eric Schwarzer, Hans-Jürgen Richter, Tassilo Moritz
Publié dans: International Journal of Applied Ceramic Technology, Numéro 12/1, 2015, Page(s) 26-31, ISSN 1546-542X
Éditeur: American Ceramic Society
DOI: 10.1111/ijac.12306

Additive Manufacturing of Metallic and Ceramic Components by the Material Extrusion of Highly-Filled Polymers: A Review and Future Perspectives
Auteurs: Joamin Gonzalez-Gutierrez, Santiago Cano, Stephan Schuschnigg, Christian Kukla, Janak Sapkota, Clemens Holzer
Publié dans: Materials, Numéro 11/5, 2018, Page(s) 840, ISSN 1996-1944
Éditeur: MDPI Open Access Publishing
DOI: 10.3390/ma11050840

Non-peer reviewed articles (3)

Ceramic Injection Moulding and Ceramic Additive Manufacturing side by side: Opportunities and challenges
Auteurs: Tassilo Moritz, Axel Müller-Köhn, Johannes Abel, Uwe Scheithauer, Steven Weingarten
Publié dans: Powder Injection Moulding International, Numéro vol. 12 (2018) No. 4, 2018, Page(s) 77-84, ISSN 2055-6667
Éditeur: Inovar Communications Ldt.

CerAMfacturing, Development of ceramic and multi material components by additive manufacturing methods for personalized medical products, H2020
Auteurs: Tassilo Moritz
Publié dans: Impact, Numéro 2017/3, 2017, Page(s) 80-82, ISSN 2398-7073
Éditeur: Science Impact Ltd
DOI: 10.21820/23987073.2017.3.80

Medizinische Komponenten und Design-Artikel aus Keramik - hergestellt mit additiver Fertigungstechnik

Auteurs: Tassilo Moritz, Uwe Scheithauer, Eric Schwarzer, Matthias Ahlhelm
Publié dans: wt Werkstattstechnik online, Numéro Jahrgang 106 (2016) H. 7/8, 2016, Page(s) 569-570, ISSN 1436-4980
Éditeur: VDI Verein Deutscher Ingenieure

Dernière mise à jour: 6 Septembre 2024

Permalink: https://cordis.europa.eu/project/id/678503/results/fr