**cover letter**

Multi-color ceramic-based 4D components – Additive Manufacturing of black-and-white zirconia components by Thermoplastic 3D-Printing (T3DP)

* A rationale on why this work should be published in JoVE’s unique multimedia format

AM technologies allow the realization of complex structures which could not be manufactured before. The combination of this technologies with the benefits of Multi-Material-components opens the door to various applications in nearly all field of life, environment and technology.

To illustrate the principles and the benefits of the T3DP-technology to all people the multimedia format of JoVE is just perfect. The reader will see all necessary manufacturing steps and will understand the whole technology within minutes.

* All author contributions
* Steven Weingarten ([steven.weingarten@ikts.fraunhofer.de](mailto:steven.weingarten@ikts.fraunhofer.de))

Mr. Weingarten chose this topic as topic for his diploma thesis. He planned and performed nearly all tests and discussed the results.

* Uwe Scheithauer ([uwe.scheithauer@ikts.fraunhofer.de](mailto:uwe.scheithauer@ikts.fraunhofer.de))

Mr. Scheithauer was one of the supervisors of the diploma thesis of Mr. Weingarten, conceived the topic and organized the development of the T3DP-device and designed some of the test components.

* Robert Johne ([robert.johne@fraunhofer.sg](mailto:robert.johne@fraunhofer.sg))

Mr. Johne is an expert for the parameter screening to identify the right dispensing parameters for T3DP. He supported the work of Mr. Weingarten in this topic.

* Johannes Abel ([johannes.abel@ikts.fraunhofer.de](mailto:johannes.abel@ikts.fraunhofer.de))

Mr. Abel is an expert for thermoplastic-based ceramic suspensions and supported Mr. Weingarten during the suspension development.

* Eric Schwarzer ([eric.schwarzer@ikts.fraunhofer.de](mailto:eric.schwarzer@ikts.fraunhofer.de))

Mr. Schwarzer is an expert for rheological measurement and did all rheological measurements for this work.

* Tassilo Moritz ([tassilo.moritz@ikts.fraunhofer.de](mailto:tassilo.moritz@ikts.fraunhofer.de))

Dr. Moritz was one of the supervisors of the diploma thesis of Mr. Weingarten and project leader of the CerAMfacturing-project.

* Alexander Michaelis (alexander.michaelis@ikts.fraunhofer.de)

Prof. Michaelis was the university supervisors of the diploma thesis of Mr. Weingarten and discussed all results with Mr. Weingarten.

* The names of any JoVE editors who have assisted you in the submission process

Jialan Zhang [jialan.zhang@jove.com](mailto:jialan.zhang@jove.com)

* A list of 6 peer reviewers’ names with their institutional affiliation and email address.
* Jens Günster, Prof. Bundesanstalt fur Materialforschung und –prufung, [Jens.Guenster@bam.de](mailto:Jens.Guenster@bam.de)
* Prof. Nahum Travitzky, Friedrich-Alexander-Universitat Erlangen-Nurnberg, [nahum.travitzky@fau.de](mailto:nahum.travitzky@fau.de)
* Dr. Johannes Homa, Lithoz, [jhoma@lithoz.com](mailto:jhoma@lithoz.com)
* Dr. Martin Schwentenwein, Lithoz, [mschwentenwein@lithoz.com](mailto:mschwentenwein@lithoz.com)
* Christos G. Aneziris, IKGB der TU BA Freiberg, [aneziris@ikgb.tu-freiberg.de](mailto:aneziris@ikgb.tu-freiberg.de)
* Aldo Boccaccini, Friedrich-Alexander-Universitat Erlangen-Nurnberg, [aldo.boccaccini@fau.de](mailto:aldo.boccaccini@fau.de)

Up to three opposed reviewers may also be suggested.

* Dr. Wolfgang Kollenberg, WZR ceramic solutions, [w.kollenberg@wzr.cc](mailto:w.kollenberg@wzr.cc)