Enabling advanced functionalities of Diamond and other ultra-hard materials by Integrated Pulsed Laser Ablation Technologies

Fact Sheet

Project information

DIPLAT

Grant agreement ID: 314731
Status
Closed project

Funded under:
FP7-NMP

Overall budget:
€ 5 108 606,56

EU contribution
€ 3 199 685

Coordinated by:
EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH
Switzerland

Start date
15 January 2013

End date
14 July 2016

Objective

Diamond and other ultra-hard materials possess outstanding mechanical, wear and thermal properties that make them attractive to manufacture a wide range of high value-added products such as high-performance, smart tools. However, due to the extreme properties of this group of materials, efficient and precise generation of complex 3D freeform geometries and structures to meet the needs for a further development of high-performance tools is still a challenge. DIPLAT addresses the need for an efficient, precise and flexible processing technology for ultra-hard materials in tooling applications, in order to fully exploit the potential of these materials. By smartly utilizing the advantages of high brilliance short and ultra-short pulsed lasers, a tooling technology based on 3D Pulsed Laser Ablation (PLA) will be developed and demonstrated for various industrial applications. DIPLAT will introduce new technology platform for producing ultra-hard tools with enhanced functionality, outstanding machining performance and superior lift-time. In this regard, DIPLAT fosters the following four main scientific and technological objectives: (1) Design functional surfaces (with controlled micro geometries) on diamond and other ultra-hard materials to enable enhanced functionality for tooling applications; (2) Study and development of advanced 3D processing strategies for structuring/conditioning of ultra-hard tool surfaces and superabrasive grain layers by Pulsed Laser Ablation; (3) Develop and implement a novel multi-axis control concept and a model-based CAM software support module to enable optimized 3D pulsed laser processing; (4)
Fabrication of various novel prototype tools made of ultra-hard materials and demonstration of their superior performance and functionality in challenging industrial applications. DIPLAT will lead to a technological breakthrough that will push European manufacturing industries to the cutting edge of high-performance machining and tooling technology.

**Field of Science**

/natural sciences/physical sciences/optics/laser physics

/natural sciences/mathematics/pure mathematics/geometry

/natural sciences/computer and information sciences/software

**Programme(s)**

FP7-NMP - Specific Programme "Cooperation": Nanosciences, Nanotechnologies, Materials and new Production Technologies

**Topic(s)**

FoF.NMP.2012-7 - Innovative technologies for casting, material removing and forming processes

**Call for proposal**

FP7-2012-NMP-ICT-FoF

See other projects for this call

**Funding Scheme**

CP-TP - Collaborative Project targeted to a special group (such as SMEs)

**Coordinator**

EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH

Raemistrasse 101
8092 Zuerich
Switzerland

Higher or Secondary Education Establishments

EU Contribution € 839 600

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Administrative Contact
Maximilian Warhanek (Mr.)

**Participants (7)**
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<tr>
<th>Organisation</th>
<th>EU Contribution</th>
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<th>Address</th>
<th>Activity type</th>
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<tr>
<td>THE UNIVERSITY OF NOTTINGHAM</td>
<td>€ 590 114,89</td>
<td>United Kingdom</td>
<td>University Park Ng7 2rd Nottingham</td>
<td>Higher or Secondary Education Establishments</td>
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<td>ELEMENT SIX LIMITED</td>
<td>€ 190 576,23</td>
<td>Ireland</td>
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<td>WALTER MASCHINENBAU GMBH</td>
<td>€ 504 730</td>
<td>Germany</td>
<td>Jopestrasse 5 72072 Tubingen</td>
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<td>DIAMOUTILS SAS</td>
<td>France</td>
<td>€ 403,786,40</td>
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<td>Denmark</td>
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REISHAUER AG
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Administrative Contact
Christoph Rudolf (Mr.)

EU Contribution
€ 282 313.08

Last update: 22 May 2017
Record number: 105911