

Masterproject - Spring 2011

Laboratory for Photonic Materials
and Characterization
EPFL
1015 Lausanne, Switzerland

Advanced Materials Processing
Empa Thun
Feuerwerkerstrasse 39
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Industrial Laser Colouring of Ceramics

Laser marking is an attractive and flexible technology. The advantages over other techniques, (like ink marking, pad printing, screen printing, ...) is better marking capabilities, permanence of the mark, high speed, short changeover time, easier integration into other processes. Among laser marking technologies, marking by means of powders sintering is taking more and more place in industries because it opens new doors, particularly in aesthetics applications. Laser sintering is well established for 3D rapid prototyping by using polymers or metallic powders. Laser sintering of ceramic powders onto a substrate is still not well established in industrial environment because demands were not identified yet and technologies not fully operational.

The process of ceramic sintering of powders is characterized by the absorption of laser radiation by the powder. The generated heat must be accurately controlled for sintering the powder and adhesion onto the substrate. The result is a ceramic marking having an excellent durability, quality and wide colour palette allowing new aesthetical aspects.

The aim of this project is to develop new powders composition and use them for laser marking over a variety of substrates (glass based, metals or enamels). The criteria of achievement are colours and quality of marks durability; in particular, white will be an issue. At the end of the work, we should better understand the physico-chemical principles of the process and propose a set of laser parameters in relation with powders compositions. Therefore in depth characterisation of the obtained materials and processes are crucial, but satisfying industrial needs as quality and economical viability.

The student will work at Asulab in Marin. He/she will profit of the in-house experience in laser techniques and material science. This work is remunerated.s

STI Microtechnique	STI Matériaux	STI Mécanique	STI Electricité & Electronique	SB Physique	SB Chimie
x	xx	x	x	xx	xx

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