Laser marking surface of materials with white and other colours

SUMMARY

This technology is about marking surfaces of materials with colour, by creating different shades on the surface by bursts of femtosecond laser pulses.

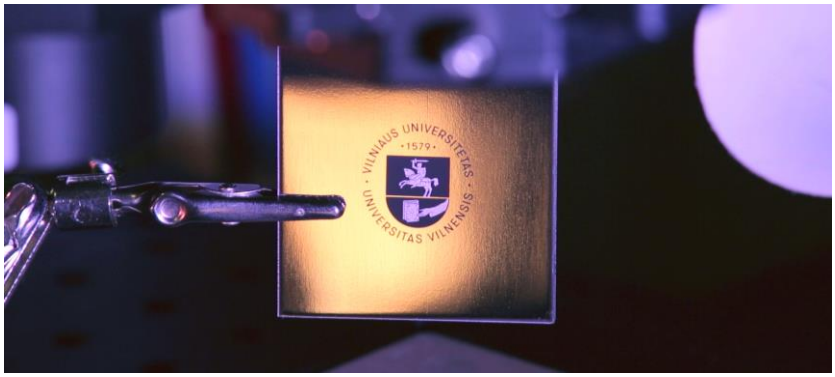
BACKGROUND

Laser marking of materials is used in many fields, e.g., marking of medical devices, mechanical parts, presentation of information on the surface of devices, presentation of logos, etc.. Laser marking can be done by modifying surface structure (usually black colour marking), by forming a layer of oxides or periodic gratings on the surface, which generate a specific colour due to interference. The downside of these methods is limited range of colours and relatively complicated marking procedure.

TECHNOLOGY

We propose a method for marking the surface of different materials by bursts of femtosecond laser pulses. Laser bursts of light pulses, when loosely focused on the surface of a material, produce special structures that change the reflective properties of light from the surface. By changing laser, burst, beam and scanning parameters, it is possible to obtain different colours of the laser-marked surface. Other colours can be achieved by allowing the surface to undergo chemical or physical changes (e.g., oxidation, phase transition) during processing.

This method does not destroy inner structures of the material, so it provides durable colour marking. The size of marking can be as small as 50×50 µm and can be increased up to tens of centimetres, while maintaining high resolution. The approximate marking speed is 10 mm^2 per second.



TECHNOLOGY READINESS LEVEL

1 2 3 **4** 5 6 7 8 9 Validated in lab

INTELLECTUAL PROPERTY

Technology developed at Vilnius University.
EPO patent application filed, patent pending.

Vilnius University

BENEFITS

- Laser colour marking, no post-processing required.
- High durability.
- Wide range of colour tones is available, using a single laser system.
- Contactless and highly repeatable method.
- Marking dimensions from 50x50 µm and higher.

APPLICATION

- Marks of any shape and sizes: bar codes, dates, QR codes, serial numbers, trademarks, logos, etc.
- Suitable for marking metals, glass, semiconductors, dielectrics and any other material.
- Applicable across industries: automotive, aerospace, electronics, medical, jewellery, etc.

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