Glass marking with laser – automatic solution of indirect marking

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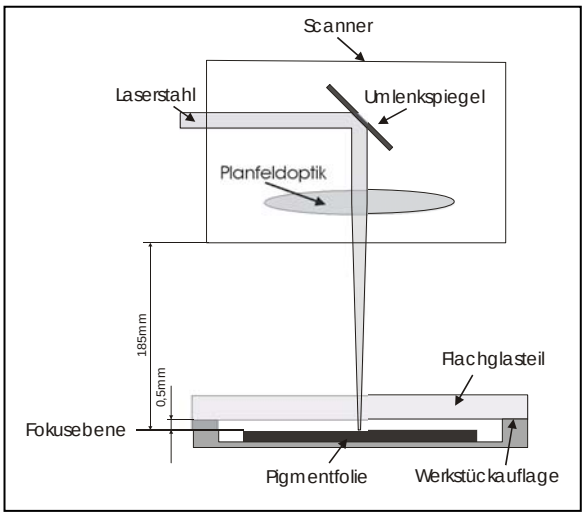
Abstract
Nowadays there is a need in life science for efficient working processes. Especially during screening of biochips, where there is a huge amount of samples, accurate and precise operation must be assured.
Therefore manual marking and packaging of microarray glass slides isn't economically. The developed marking system handles and inscribes glass slides fully automatic.

The New Process

A new process was developed to indirectly inscribe glass using pigment foil and Nd:YAG laser. This method stands out of other processes and it is a completion for conventional methods like screen printing, etching and mechanical grinding. It is distinguished through a high flexibility of the produced marking as well as the good integration in automatic production processes. The developed pigment foils make it possible to create a coloured, free of stress inscription on various glass types with the Nd:YAG-laser. The inscription has a high adhesive power, a good quality of edges and a good contrast. The characteristics of use and the inscribing quality are proofed with different assessment methods. The examinations are promoted by the BMWI-Gewiplan within the scope of a research subject.

Principle of the glass marking

The treatment is based on an indirect marking with Nd:YAG-laser under usage of a pigment foil. This foil is made of organically assistance substances and various solid powders, which determine the respective colour. The foil is mechanical flexible - it has the necessary transportation ability. Because of the transparency of most glass only the pigment foil lying under the slide absorbs the laser beam energy which leads to a local heating. Through the energy input pigments from the foil get catapulted out and sinter on the glass surface.



Picture 1: Principle indirect laser marking

Automatic solution of indirect laser marking

With the **GLas 100D – Slide Marker** a marking system is introduced to the industry, which is able to produce durable inscriptions on microarray glass slides with reduced impact on the glass surface. The Marker uses a Nd:YAG-laserbeam.

The automatic handling system is designed modular. It consists of glass handling, glass inscription, cleaning and packaging units. Handling of glass slides between several units is done by vacuum grippers and conveyor belts. Right before packaging a scanner controls the inscribed barcode. Thereby the system ensures correct inscriptions and the right order of packaging.

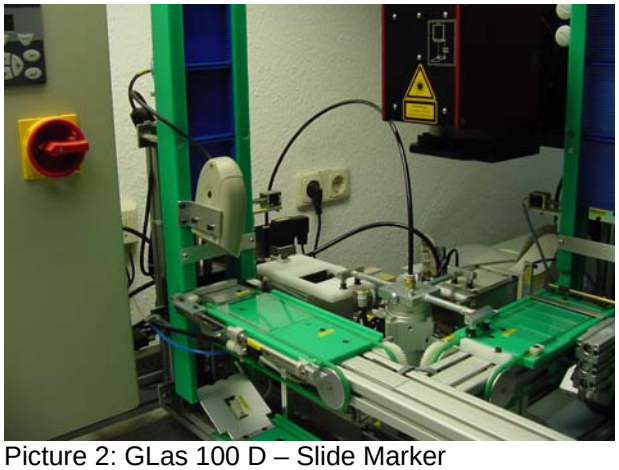
The flexible pigment foil is transported under the glass. Particles that emerge during marking processes are exhausted. In a separate unit, slides are cleaned by rotating brushes.

The marking system is based on a diode pumped Nd:YAG-laser marker by Rofin Sinar which offers high flexibility and reliability. Our air-cooled **GLas 100 D – Slide Marker** is available as OEM-version or stand-alone system (class A laser product).

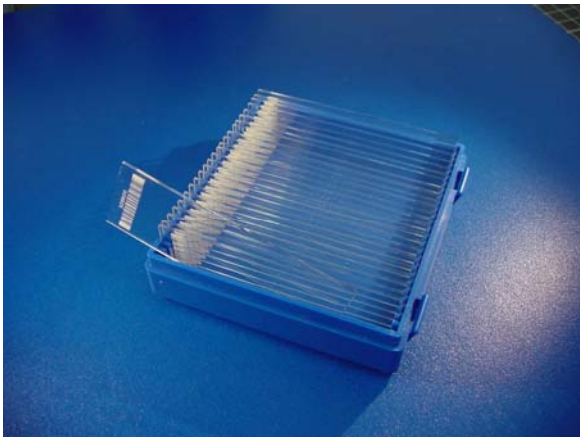
Application

Our marking process is suitable for all glass sorts which have transparency for wavelength of 1064 nm. Glass plates, slides and bodies in a range of 0,5 to 60 mm thickness can be inscribed.

Our flexible marking process assures heat and corrosion resistant inscription. The automatic handling system is especially designed for processing biochips (75x25x1 mm) with a handling rate up to 600 slides per hour.
Inscriptions of serial numbers, logos, barcodes or special codes can be easily produced using the powerful software.



Picture 2: GLas 100 D – Slide Marker



Picture 3: Barcode on microarray glass slide

Literature

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