

Record 1 of 10**Title:** Investigation of the laser generated ablation plasma plume dynamics and plasma plume sound wave dynamics**Author(s):** Tanski, M (Tanski, Mateusz); Barbucha, R (Barbucha, Robert); Kocik, M (Kocik, Marek); Garasz, K (Garasz, Katarzyna); Mizeraczyk, J (Mizeraczyk, Jerzy)**Edited by:** Wolinski WL; Jankiewicz Z; Romaniuk RS**Source:** LASER TECHNOLOGY 2012: APPLICATIONS OF LASERS **Book Series:** Proceedings of SPIE **Volume:** 8703 **Article Number:** 870300 **DOI:** 10.1117/12.2013415 **Published:** 2013**Abstract:** We investigated the dynamics of laser generated ablation plasma plume expanding in ambient air and dynamics of the sound wave generated by the expanding plasma. The ablation plasma plume was generated during nanosecond laser micromachining of the thin metal foil. The time-resolved images of the expanding plasma plume and sound wave were captured at several nanosecond intervals. Using captured images the expansion rate of the plasma plume was determined. The initial velocity of the plasma was found to vary from 6.0.10(3) m/s +/- 0.3.10(3) m/s to 7.3.10(3) m/s +/- 0.3.10(3) m/s depending on the laser fluence. The initial velocity of the sound wave generated by the expanding plasma plume also varies with laser fluence. We also investigated sound wave using acoustic microphone. Based on obtained results we proposed a method for automatic focusing of the laser beam before laser micromachining that involves sound wave acoustic signal analysis.**Accession Number:** WOS:000322746900023**Conference Title:** 10th Conference on Laser Technology - Applications of Lasers**Conference Date:** SEP 24-28, 2012**Conference Location:** Tech Univ Szczecin, Fac Elect Engr, Szczecin, POLAND**Conference Sponsors:** Polish Acad Sci, Comm Elect & Telecommunicat, Assoc Polish Elect Engineers, Polish Comm Optoelectron, Photon Soc Poland, SPIE, W Pomeranian Univ Technol, Warsaw Univ Technol, Mil Univ Technol Warsaw**Conference Host:** Tech Univ Szczecin, Fac Elect Engr**ISSN:** 0277-786X**ISBN:** 978-0-8194-9494-8**Record 2 of 10****Title:** Diagnostics of UV Nanosecond Laser Generated Plasma Plume Dynamics in Ambient Air Using Time-Resolved Imaging**Author(s):** Tanski, M (Tanski, Mateusz); Barbucha, R (Barbucha, Robert); Kocik, M (Kocik, Marek); Garasz, K (Garasz, Katarzyna); Mizeraczyk, J (Mizeraczyk, Jerzy)**Source:** PRZEGLAD ELEKTROTECHNICZNY **Volume:** 88 **Issue:** 8 **Pages:** 25-28 **Published:** 2012**Abstract:** The dynamics of UV nanosecond laser generated ablation plasma plume expanding in ambient air was investigated. The time-resolved images of the forming and expanding ablation plume were captured. Using the captured images the initial velocity of the plasma was found to vary from 6.10(3) m/s to 7.10(3) m/s depending on the laser pulse fluence. The plasma expansion parameters obtained by us were compared with those predicted by shockwave model and drag model. It was found that drag model better describes plasma expansion in our experiment.**Accession Number:** WOS:000308317800008**ISSN:** 0033-2097**Record 3 of 10****Title:** Laser Direct Imaging system for high density interconnects on PCB**Author(s):** Barbucha, R (Barbucha, Robert); Kocik, M (Kocik, Marek); Mizeraczyk, J (Mizeraczyk, Jerzy)**Source:** PRZEGLAD ELEKTROTECHNICZNY **Volume:** 84 **Issue:** 3 **Pages:** 54-56 **Published:** 2008**Abstract:** The increasing demands for miniaturization and better functionality of electronic components and devices have a significant effect on the requirements facing the printed circuit board (PCB) industry. This article shows an alternative method for creating electric circuit patterns on PCB in high density interconnects technology. In this article a prototype system for laser direct imaging as well as results of imaging examples are presented.**Accession Number:** WOS:000256288600017**Conference Title:** 5th International Conference on New Electrical and Electronic Technologies and their Industrial Implementation**Conference Date:** JUN 12-15, 2007**Conference Location:** Antalowka, POLAND**ISSN:** 0033-2097**Record 4 of 10****Title:** Recent progress in direct exposure of interconnects on PCBs**Author(s):** Barbucha, R (Barbucha, Robert); Mizeraczyk, J (Mizeraczyk, Jerzy)**Source:** CIRCUIT WORLD **Volume:** 42 **Issue:** 1 **Pages:** 42-47 **DOI:** 10.1108/CW-10-2015-0050 **Published:** 2016**Abstract:** Purpose - This paper aims to use a survey of techniques to present the patterning of electric circuitry on printed circuit boards (PCBs). Second, a proposal of a new technology for direct exposure of interconnects on PCBs, using a digital micromirror device (DMD) is presented.**Design/methodology/approach** - In this proposal, the DMD chip was incorporated into a prototype system for exposure of soldermask pattern for a mass scale production. As a light source, 52 semiconductor UV lasers were combined together to deliver UV powerful beam onto the DMD chip area.**Findings** - A laser beam power of around 9 W was achieved from a single exposure head. With five exposure heads installed into a single machine, it is possible to expose 1,400 PCB panels per day. Such a production rate from a single exposure machine satisfies the demands of biggest PCB factories.**Research limitations/implications** - The Gaussian energy distribution of the laser beam from the 52-lasers head on the PCB surface was experimentally found. Because the exposure image needs to be highly uniform, this made a problem when the printed circuitry quality is considered. This problem was solved by using a software algorithm.**Practical implications** - The use of UV lasers exposure heads brings economical advantages over conventional bulb UV lamps. The power consumption drops down ten times for lasers source.**Social implications** - Because the exposure processing can be made with lower electric costs and higher yield, it will make the PCBs cheaper.**Originality/value** - At present, the idea of collecting a great number of lasers as a UV source for exposure head is attractive solution.**Accession Number:** WOS:000373379600008**Conference Title:** 39th International-Microelectronics-and-Packaging-Society-Poland Conference (IMAPS Poland)**Conference Date:** SEP 20-23, 2015**Conference Location:** Gdansk Univ Technol, Fac Elect Telecommunicat & Informat, Gdansk, POLAND**Conference Sponsors:** Int Microelectron & Packaging Soc, Poland Chapter, Polish Acad Sci, Comm Elect & Telecommunicat, Gdynia Maritime Univ, Fac Elect Engr, Gdansk Univ Technol**Conference Host:** Gdansk Univ Technol, Fac Elect Telecommunicat & Informat**ISSN:** 0305-6120**eISSN:** 1758-602X**Record 5 of 10****Title:** Ultraviolet laser treatment of titanium surface**Author(s):** Balchev, I (Balchev, Ivaylo); Minkovski, N (Minkovski, Nikolai); Dimitrov, K (Dimitrov, Krasimir); Shipochka, M (Shipochka, Maria); Barbucha, R (Barbucha, Robert)**Edited by:** Nesheva D; Chamati H; Genova J; Gesheva K; Ivanova T; Szekeres A**Source:** INERA CONFERENCE 2015: LIGHT IN NANOSCIENCE AND NANOTECHNOLOGY (LNN 2015) **Book Series:** Journal of Physics Conference Series **Volume:** 682 **Article Number:** 012033 **DOI:** 10.1088/1742-6596/682/1/012033 **Published:** 2016**Abstract:** Interaction of a third harmonic of DPSS laser, wavelength 355 nm and pulse duration of 30 ns with titanium wafers was studied. It was investigated the structure of laser ablated titanium surface, depending on the laser beam scanning speed, and laser pulse frequency. The titanium surface modification was studied by scanning electron microscopy (SEM) and XPS (X-ray Photoelectron Spectroscopy). Nanosecond irradiation with ultraviolet light of Ti plate led to the formation of high porous granular structures consisting of agglomerated micro-and submicro-particles.

Accession Number: WOS:000372173400033**Conference Title:** Conference on Light in Nanoscience and Nanotechnology (LNN)**Conference Date:** OCT 20-22, 2015**Conference Location:** Hissar, BULGARIA**Conference Sponsors:** Bulgarian Acad Sci, Inst Solid State Phys**ISSN:** 1742-6588**Record 6 of 10****Title:** The concept and pulse measurements of a prototype femtosecond laser**Author(s):** Garasz, K (Garasz, Katarzyna); Barbucha, R (Barbucha, Robert); Kocik, M (Kocik, Marek); Tanski, M (Tanski, Mateusz); Mizeraczyk, J (Mizeraczyk, Jerzy); Nejbauer, M (Nejbauer, Michal); Radzewicz, C (Radzewicz, Czeslaw)**Source:** PRZEGLAD ELEKTROTECHNICZNY **Volume:** 88 **Issue:** 11B **Pages:** 11-13 **Published:** 2012**Abstract:** This article presents the idea of a prototype femtosecond laser for micromachining of materials. The laser consists of a solid-state femtosecond oscillator and a fibre ytterbium-doped amplifier. Femtosecond laser materials processing offers many advantages over the long pulse (i. e. nanosecond) laser micromachining. Ultra-short laser pulses have a unique capacity to interact with different materials without transferring heat to the area surrounding the target. This allows very precise and pure laser-processing, clean cuts and engravings with sharp edges. (The concept and pulse measurements of a prototype femtosecond laser).**Accession Number:** WOS:000310614400003**ISSN:** 0033-2097**Record 7 of 10****Title:** Equivalent circuit of existing cavity-resonant type microwave plasma applicator**Author(s):** Sobanski, M (Sobanski, Michal); Barbucha, R (Barbucha, Robert); Lubanski, M (Lubanski, Mieczyslaw); Dors, M (Dors, Miroslaw); Jasinski, M (Jasinski, Mariusz); Mizeraczyk, J (Mizeraczyk, Jerzy)**Source:** PRZEGLAD ELEKTROTECHNICZNY **Volume:** 88 **Issue:** 11B **Pages:** 72-74 **Published:** 2012**Abstract:** We present equivalent circuit of existing cavity-resonant type microwave plasma applicator. The applicator can be used for conversion of hydrocarbons into hydrogen. It operates at atmospheric pressure and frequency of 2.45 GHz. The discussed applicator construction is based on ideas described in US patent applications. There are two electrodes mounted in reduced height waveguide. The equivalent circuit includes formulas which allow to calculate tuning characteristics of discussed cavity-resonant-type microwave applicator. The calculated tuning characteristics are very similar to those obtained from an experiment. (Equivalent circuit of existing cavity-resonant type microwave plasma applicator)**Accession Number:** WOS:000310614400019**Author Identifiers:**

Author	ResearcherID Number	ORCID Number
Dors, Miroslaw	A-1547-2008	0000-0001-7720-3066

ISSN: 0033-2097**Record 8 of 10****Title:** Miniature ElectroHydrodynamic Pump Driven by DC Voltage for Dielectric Liquids**Author(s):** Tanski, M (Tanski, Mateusz); Janke, M (Janke, Michal); Barbucha, R (Barbucha, Robert); Garasz, K (Garasz, Katarzyna); Kocik, M (Kocik, Marek); Mizeraczyk, J (Mizeraczyk, Jerzy)**Source:** PRZEGLAD ELEKTROTECHNICZNY **Volume:** 87 **Issue:** 10 **Pages:** 144-146 **Published:** 2011**Abstract:** In this paper, the design and results of basic performance tests of electrohydrodynamic (EHD) micropump intended for integrated electronic cooling systems is presented. The pump can induce flow of dielectric liquids that can be used to transfer heat away from electronic components. The micropump is driven by high DC voltage, but consumes below 250 mW of power (current in the order of tens of microamperes). (Miniature ElectroHydrodynamic Pump Driven by DC Voltage for Dielectric Liquids).**Accession Number:** WOS:000296743400033**ISSN:** 0033-2097**Record 9 of 10****Title:** Laser system for direct imaging of high density interconnects on PCB**Author(s):** Barbucha, R (Barbucha, Robert); Janke, M (Janke, Michal); Garasz, K (Garasz, Katarzyna); Kocik, M (Kocik, Marek); Tanski, M (Tanski, Mateusz); Mizeraczyk, J (Mizeraczyk, Jerzy)**Source:** PRZEGLAD ELEKTROTECHNICZNY **Volume:** 86 **Issue:** 11A **Pages:** 156-159 **Published:** 2010**Abstract:** Recently, the most popular method to manufacture electric circuit patterns on PCB is photolithography. This method is useless, if density of interconnections on PCB goes below 120 um/120 um (track/space width). Laser Direct Imaging method is a solution, in case of higher density of interconnections on PCB. This article describes design of prototype system for Laser Direct Imaging. (Laser system for direct imaging of high density interconnects on PCB).**Accession Number:** WOS:000283921500032**ISSN:** 0033-2097**Record 10 of 10****Title:** Application of nanosecond laser micromachining in fabrication of metal MEMS elements**Author(s):** Tanski, M (Tanski, Mateusz); Barbucha, R (Barbucha, Robert); Janke, M (Janke, Michal); Garasz, K (Garasz, Katarzyna); Kocik, M (Kocik, Marek); Mizeraczyk, J (Mizeraczyk, Jerzy)**Source:** PRZEGLAD ELEKTROTECHNICZNY **Volume:** 86 **Issue:** 11A **Pages:** 211-213 **Published:** 2010**Abstract:** In this article we present the possible application of nanosecond laser micromachining in fabrication of metal MEMS element. We describe the process of laser micromachining of materials and present few examples of metal MEMS elements. We also focus on the problem of thermal degeneration of material during process of nanosecond laser micromachining. This problem is to be avoided when femtosecond laser pulses are used in MEMS laser manufacturing. (Application of nanosecond laser micromachining in fabrication of metal MEMS elements).**Accession Number:** WOS:000283921500048**ISSN:** 0033-2097

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