

# PROCEEDINGS OF SPIE

## ***Laser-based Micro- and Nanopackaging and Assembly IV***

**Wilhelm Pfleging  
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Kunihiko Washio  
Jun Amako  
Willem Hoving**  
*Editors*

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## Introduction

At the present time, high-tech industries have increasingly stronger demands for advanced laser-based micro- and nano-packaging and assembly technologies which enable specialized prototypes and high-throughput devices with micro- and nanostructures to realize fluidic, biological, chemical, electronic, mechanical, and photonic functionalities. Cutting-edge designs and applications are increasingly based on micro- and nano-system technologies. However, the realization of such devices or functional prototypes imposes new challenges for patterning, packaging, and assembly.

Functional systems are continuously becoming more miniaturized and complicated during the course of performance improvement. Nano-materials and nano-patterning technologies become more closely associated with micro-materials and micro-structuring technologies, leading to new applications and research fields but at the same time imposing new challenges for appropriate assembly and packaging technologies. Due to the ever-increasing complexity of device structures, processing needs for wide varieties of materials and their combinations have been increasing in areas such as MEMS and optofluidics. Furthermore, in certain application fields such as large-area flexible displays and photovoltaics, aspect ratios between horizontal and vertical device features are rapidly increasing. Moreover, with increasing device complexity the laser-induced changes of material properties on micro- or nanometer scales become more and more important. Material and surface modifications such as chemical or structural changes must be avoided in some applications (e.g., photovoltaics) or can be used in other applications (e.g., TFT Annealing) for a goal-oriented surface functionalization. In both cases, a strong demand is to develop novel processing technologies with high efficiency and throughput.

The "Laser-based micro packaging" conference series was established in 2002. In 2007 the conference was renamed as Laser-Based Micro- and Nano-Packaging and Assembly (LBMP) to reflect the relevance of nanometer-scaled structures. The aim of this conference is to bring together scientists and engineers working on application-oriented aspects of laser-based micro- and nano-packaging for mechanical, electronic, photonic, chemical, biological, bio-active, or bio-compatible devices including MEMS/bio-MEMS, MOEMS, and OLED. Because of the great economical demand, material processing is playing an increasingly important role in current and future LBMP conferences, along with new green technologies such as photovoltaics and advanced energy storage systems.

The conference LBMP-IV was held 26–28 January 2010 as part of LASE 2010 at Photonics West in San Francisco, California. LBMP-IV comprised 28 oral and 3 poster presentations which were presented by speakers from the Canada, China, France, Italy, Japan, Germany, UK and USA. Presentations represented a number

of topics including: modeling and characterization of laser-mater interaction, laser welding and joining, ultrafast laser, advanced laser deposition, optical components and devices, micro- and nano-machining, direct-write processing and surface modification, and photovoltaics. The photovoltaics session was jointly organized with Conference 7584: Laser Applications in Microelectronic and Optoelectronic Manufacturing XV (LAMOM XV).

We would like to thank the program committee members and the SPIE technical staff for their great efforts during the planning and organization of LBMP-IV. We would also like to thank the invited speakers and presenters of the contributed papers for their contribution to the success of the conference. All of the manuscripts were peer reviewed in order to publish high-quality conference proceedings.

**Wilhelm Pfleging  
Yongfeng Lu  
Kunihiko Washio**