R2R Technology for Organic Electronics and Photovoltaics

Jens Hänel, Bernd Keiper, Sven Albert, Ronny Busch, Maurice Clair, and Christian Scholz; 3D-Micromac AG, Annaberger Straße 240, Chemnitz, Germany

Abstract

The development of the new material group of conductive polymers has lead to the coverage of whole new areas of applications. For some years cheap mass fabricated printed electronics have been researched. 3D-Micromac AG develops processes for micromachining of thin films of conductive polymers in roll-to-roll-technique by laser. As already low pulse energies in the range of ~10µJ at a spot diameter of 50µm are sufficient, high repeating ultra-short pulse lasers (pico- and femtoseconds) can be applied. With this kind of lasers excellent results at high machining speeds can be achieved.

An example for the laser structuring of thin films on flexible substrates is the generation of all necessary insulation cuts (P1, P2, P3) in flexible solar cells. Such cuts are done with highest precision and without damage to the underlying layers. Currently used mechanic structuring technologies which provide unsatisfying quality and processing speeds can thereby be replaced with a superior laser machining technology that provides higher quality and machining speeds. By using roll-to-roll systems, high repeating lasers and the so-called "on-the-fly" technology for compensation of reel movement through-put can be significantly increased and as a result the costs for the end-costumer will be more attractive. The lecture presents the results of the process and machine development which will be demonstrated by the example of micromachining of thin films on flexible substrates e.g. flexible solar cells.