



Jens Bliedtner

Ernst-Abbe-University of Applied Sciences Jena
Germany

Functionalization of surfaces to create partially conductive structures with short and ultrashort pulse laser radiation

Abstract:

This article examines the potential and possibilities of a new laser-based process (LSA) for the selective metallization of three-dimensional circuit carriers. The polymer substrates can be used without additional metal fillers in the matrix, thus saving costs and resources. The area of application extends to injection-molded and additively manufactured plastic components. The process is divided into the process steps: surface activation due to laser structuring (1), nucleation of palladium on these surfaces (2) and electroless copper plating of the activated areas (3). Experimental investigations with three pulse duration from nanoseconds to femtoseconds are presented. These differ in the selected laser and pulse parameters. By varying significant process variables, interaction processes are analyzed which have a decisive influence on the subsequent activation, nucleation and metallization. The focus is on discussing the influencing parameters for generating partially conductive structures. As a result, exemplary process windows for polybutylene terephthalate and polyamide are shown. The important target values electrical resistance and the mechanical layer properties are also characterized. The newly developed process offers great potential for the dynamic and individualized production of electrically conductive structures on plastic components.

Biography

Jens Bliedtner studied precision engineering at the Friedrich Schiller University in Jena. He wrote his doctoral thesis in the fields of development of pulsed laser systems and special methods in macro material processing. Since 2000, Bliedtner has been a professor at the Ernst Abbe University of Applied Sciences in Jena and the head of the department production engineering and automation of production processes. Currently, he is working in the research fields of optical technology, laser material processing and additive manufacturing.