

Abstract DPG-Tagung

Nanostructuring of metallic thin films

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Several methods are established for micro- and nanostructuring of metallic and dielectric films:

Focused ion beam milling, ultraviolet and electron beam lithography and nanoimprint techniques. In this context, we introduce a new method of structuring metallic thin films: A focused electron beam is used for directly melting metallic films. Charge carrier densities in the range of $10^6 \dots 10^8 \mu\text{C}/\text{cm}^2$ in conjunction with beam currents of $0.1 \dots 1.5 \text{ nA}$ are applied. The applicability on different substrate-metal systems is demonstrated. Structures of different geometry in the sub-100-nanometer range can be achieved by this method. Scanning electron microscopy and atomic force microscopy were used for topographical characterization. The excitation and propagation of surface plasmons in structures of different sizes and geometries was checked by scanning optical near-field microscopy.