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S E M I N A R

aus

Halbleiterphysik und Nanotechnologie

Di, 10.5.2011, 11 Uhr c.t.
Hörsaal für Physik

Direct writing of optical waveguides into organically modified mesoporous silica by two-photon-induced polymerization

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The three-dimensional fabrication of optical waveguides is a suitable means to generate connections between electrical components on a very small scale where copper circuits encounter severe limitations.
In this work the application of optically clear, organically modified porous silica monoliths and thin films as a host material for polymeric waveguides to be inscribed into the solid host structure by two-photon-induced photopolymerization is investigated. Porosity is generated using a lyotropic liquid crystalline surfactant/solvent system as a template for the solid silica material obtained by a sol–gel transition of a liquid precursor. In order to reduce the brittleness of the purely inorganic material, organic–inorganic co-precursor molecules that contain poly(ethylene glycol) chains are synthesized and added to the mixture, which successfully suppresses macroscopic cracking and leads to flexible thin films.
The structure of the thus-obtained porous organic–inorganic hybrid material is investigated by atomic force microscopy. It is shown that the modified material is suitable for infiltration with photocurable monomers and functional polymeric waveguides can be inscribed by selective two-photon-induced polymerization.