Structured light for laser processing of azopolymers and chalcogenide glasses

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In recent years, structured light with a complex distribution of amplitude, phase, and polarization have been increasingly used for laser material processing. Structured laser beams make it possible to control the morphology of structures formed on the surface and in the volume of materials both at the nano- and micro-levels. For example, laser beams with a helical wavefront and their superpositions can be used to form twisted microstructures even inside polymeric materials. Even more, opportunities arise when using structured laser radiation in the processing of polarization-sensitive materials, such as various azopolymers and chalcogenide glasses (CGs). Multilayer structures based on CGs and azopolymers are promising optically sensitive materials used for dynamic systems of optical conversion and signal transmission, data recording, and storage. Such materials are able to change their structure under the influence of illuminating laser radiation - not only depending on the amplitude but also the polarization of the radiation. Here, we present some examples of the use of structured laser beam for precision laser processing of such polarization-sensitive materials.

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