

Nanooptics and nanophotonics

Organic and inorganic polarization sensitive media

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Polarization holography has many unique properties and possibilities as compared to scalar holography. These ones result in advantages of polarization holographic information storage and in more flexible opportunities of light beam control when using light polarization sensitive photoactive mediums.

Results of comparative study of the properties and potential possibilities of three polarization sensitive media (magnetic garnets, paramagnetic garnets, polymeric composites with azobenzene polycomplexes) are presented in this work. Physical mechanisms of formation of optical anisotropy in these media under influence of polarized light are described. The main emphasis is made on realization of recording of the hologram of flat wave front in these media. Experimental investigations of such recording in new polymeric composites with azobenzene polycomplexes with coordinated metallic ions are done. Presence of the metallic ions in the polymeric composite provides with additional capability for control by external electric and/or magnetic fields. Conclusion about potential applicability of this medium for polarization holography is made.

As it follows from carried out investigations, the most suitable media for polarization holographic recording from three considered media are the films of polymeric composites containing azobenzene fragments or azobenzene polycomplexes with coordinated metallic ions. Introduction of coordinated metallic ions in the investigated polymeric composites opens additional possibilities of control of the properties of the photoactive medium, allows to increase their sensitivity in external fields.