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**HOLOGRAPHIC PROPERTIES OF THE NOVEL CHLORIDE
PHOTOTHERMOREFRACTIVE GLASS**

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A new photo-thermo-refractive glass with chlorine instead of bromine has been introduced. The new glass demonstrates better holographic properties than that of the classical photo-thermo-refractive glass.

Introduction. Based on the advantages of the chloride photo-thermo-refractive (PTR) glass over the bromide glass regarding the eligibility of spontaneous crystallization, we synthesized a standard PTR glass with chlorine instead of bromine. we present and examine the potential of this glass for use in the holographic application.

Main part. We studied a novel photo-thermo-refractive (PTR) glass, replacing bromine with chlorine. We have demonstrated that the replacement of bromine with chlorine in the PTR glass leads to an improvement of some glass properties as a holographic medium. First, the surface plasmon resonance absorption peak is shifted from 450 to 415 nm, which has a positive effect on the holographic applications in the visible and near IR regions. Secondly, volume Bragg grating (VBG) was successfully recorded in the novel glass. The photo-thermo-induced crystallization mechanism corresponds precipitation of sodium fluoride nanocrystals on a silver nanoparticle surrounded by a chlorine-containing dielectric shell. It was found that the grating has an amplitude-phase nature. In our experimental conditions, the refractive index and the absorption coefficient modulation amplitudes and diffraction efficiency for 4 J/cm^2 were found to be 7.1×10^{-4} , 0.8 cm^{-1} , and 80%, respectively. These values are slightly better than those obtained in the classic PTR. The reason may be attributed to the role of chlorine in reducing the spontaneous crystallization process in the non-exposed places, which would allow us to increase the silver concentration and reduce the scattering problem related to the nanocrystals of big sizes.

Conclusion. The replacement of bromine with chlorine in the PTR glass leads to an improvement of some optical and holographic properties of the PTR glass. VBG was demonstrated better parameters over the classical PTR glass.

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