

# Formation and investigation of diffraction microrelief fabricated on the end face of halogenide IR waveguide

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## Abstract:

The article considers the formation of diffraction microrelief on the end face of halogenide IR waveguide in order to control the radiation emerging from the waveguide. The results of the first experiments on the formation and investigation of a binary diffraction grating at the waveguide end face using the hot stamping technology are presented.

**Keywords:** diffraction microrelief, halogenide IR waveguide, binary diffraction grating, waveguide, hot stamping technology

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[Access full text \(in Russian\)](#)

## References:

- [1] Karpeyev SV, Pavelyev VS, Duparre M, Luedge B, Rockstuhl C, Schroeter S. DOE-aided analysis and generation of transverse coherent light modes in a stepped-index optical fiber. Optical Memory and Neural Networks (Information Optics) 2003; 12(1): 27-34.
- [2] Pavelyev VS, SoiferVA. Selection of laser light modes [In Russian]. In Book: Soifer VA, ed. Methods of computer optics. Ch 6. Moscow: "Fizmatlit" Publisher; 2000; 395-470.
- [3] Soifer VA. Introduction in diffractive optics [In Russian]. In Book: Soifer VA, ed. Methods of computer optics. Ch 1. Moscow: "Fizmatlit" Publisher, 2000; 11-48.
- [4] Prascioli M, Cojoc D, Cabrini S, Businaro L, Candeloro P, Tormen M, Kumar R, Liberale C, Degiorgio V, Gerardino A, Gigli G, Pisignano D, Di Fabrizio E, Cingolani R. Design and fabrication of on-fiber diffractive elements for fiber-waveguide coupling by means of e-beam lithography. Microelectron Eng 2003; 67-68: 169-174. DOI: 10.1016/S0167-9317(03)00068-6.
- [5] Johnson EG, Stack J, Suleski TJ, Koehler C, Delaney W. Fabrication of micro optics on coreless fiber segments. Appl Opt 2003; 42(5): 785-791. DOI: 10.1364/AO.42.000785.
- [6] Lavrishcheva VP. Introduction to photolithography [In Russian]. Moscow: "Energia" Publisher; 1977.
- [7] Morau WM. Semiconductor lithography: Principles, practices, and materials. New York: Springer US; 1988. ISBN: 978-0-306-42185-3.
- [8] Recknagel R-J, Notni G. Analysis of white light interferograms using wavelet methods. Opt Commun 1998; 148(1-3): 122-128. DOI: 10.1016/S0030-4018(97)00644-5.
- [9] Doskolovich LL, Golub MA, Kazanskiy NL, Khramov AG, Pavelyev VS, Seraphimovich PG, Soifer VA, Volotovskiy SG. Software on diffractive optics and computer-generated holograms. Proc SPIE 1995; 2363: 278-284. DOI: 10.1117/12.199645.
- [10] Golovashkin DL. H-wave diffraction by two-dimensional dielectric gratings [In Russian]. Mathematical modeling 2004; 16(9): 53-61.
- [11] Petit R, ed. Electromagnetic theory on gratings. Berlin, Heidelberg, New York: Springer-Verlag; 1980. ISBN: 978-3-642-81502-7.
- [12] Nikolskiy VV, Nikolskaya TI. Electro dynamics and radio wave propagation. Handbook for higher educational institutions [In Russian]. Moscow: "Nauka" Publisher; 1989.