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The paper summarizes results of more than thirty years of research of preparation and characterization of optical fibers at the Czechoslovak Academy of Sciences (CAS) and Academy of Sciences of the Czech Republic (AS CR), namely at the Institute of Chemistry of Glass and Ceramic Materials of CAS and Institute of Radio Engineering and Electronics of CAS (AS CR), nowadays the Institute of Photonics and Electronics AS CR, v.v.i. (ÚFE). This research can be characterized by two periods. In the first period till the end of 1989 the research was focused to fibers for telecommunications. Transmission properties published in the paper show that they were fully comparable with world ones. The second period from 1990 to present has been characterized by the investigation of fibers for fiber lasers and amplifiers and fiber-optic sensors. Some original structures of optical fibers designed and prepared in ÚFE are described in the paper.

New trends in preparation of preforms by the MCVD method
(I. Kašík, V. Matějec, O. Podrazký, P. Peterka, J. Mrázek) 102

The paper deals with progress in the field of preparation of preforms for drawing of optical fibres by the MCVD method. „Groundbreaking achievements concerning the transmission of light in fibers for optical communication“ were appreciated in 2009 by the Nobel prize for K. C. Kao and this paper comes from experience acquired in this field. Attention is focused namely at novel materials and fiber structures and their preparation in the field of special optical fibers for fiber amplifiers, lasers and sensors.

Drawing of optical fibers at the Institute of Photonics and Electronics (V. Matějec, O. Podrazký, J. Mrázek, P. Peterka, M. Hayer) 107

The paper deals with the process of optical-fiber drawing and shows research results achieved at the Department of Optical Fibers, Institute of Photonics and Electronics AS CR, v.v.i. (ÚFE). It presents description of basic processes in glass materials during drawing of optical fibers from preforms as well as description of experimental devices used in the ÚFE. It shows examples of results of drawing of optical fibers doped with rare-earth elements both with circular and non-circular cross-sections intended for fiber lasers and amplifiers. It also deals with drawing of special optical fibers for fiber-optic sensors, such as sectorial s-fibers, inverted-graded index fibers, fibers from soft optical glasses, chalcogenide fibers and microstructure fibers. Continuous preparation of optical fibers coated with anatase nanoparticles is also discussed in the paper.

Tapered optical fibres (T. Martan) 111

The paper deals with tapered optical fibres, their preparation and applications for sensing. Enhancement of evanescent wave overlap with an analyte is possible to achieve by tapering telecommuni-

cation fibres or steering-wheel microstructured optical fibres. It leads to increasing of sensitivity of detection in comparison to untapered fibre structure. Tapered optical fibre with immobilized optical-chemical transducer on the tip was used as a probe for local pH detection. Tapered single-mode or microstructured optical fibres were successfully prepared by a PC-controlled fibre puller of the own construction.

Fibre lasers - principles and applications (P. Peterka, P. Honzátko, M. Karásek, J. Kaňka, I. Kašík, V. Matějec) 115
Success of erbium doped fiber amplifiers in telecommunications recently stimulated spectacular progress of fiber lasers that can be now considered as a substitute for conventional solid-state lasers in many applications. In the contribution we review basic principles of fiber lasers, including high-power fiber lasers that utilize cladding pumping. We summarize also important applications of these new sources of laser radiation and we present in more detail research results in this field in the Institute of Photonics and Electronics.

All optical processing of data streams

(P. Honzátko, M. Karásek) 121
Activities of the Laboratory of nonlinear and fibre optics in the field of all-optical processing of data streams is presented. We demonstrated an all-optical modulation format converter RZ-to-NRZ, based on the cross-phase modulation with walk-off in the nonlinear loop mirror and a high conversion efficiency wavelength converter based the conversion of the cross-phase modulation into amplitude modulation in the fibre Bragg grating. Both devices have been tested at transmission rates of 10, 20, and 40 Gb/s. For testing the network devices at a repetition rate of 107 Gb/s, we developed the combination of optical multiplexer and demultiplexer.

Past, present of and prospects for optical communications in the Czech Republic (A. Kuchar) 124

The paper describes evolution of optical communications in the Czech Republic in three distinct periods of political development in the CR: from emergence of this communications branch in the CR till the end of 1989, during years 1990 to 1992 and from the beginning of 1993 till today. The paper deals with the developments in the basic and applied research, provides information on production of the relevant components and equipment, on some major optical network projects and applications. The paper concludes with discussion about prospects of optical communications in the CR.

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Interview with doc. RNDr. Miroslav Miler, DrSc. 129

Dr. Miroslav Miler was born on 11 April 1935 in Olomouc. When he celebrated his seventieth birthday five years ago Dr. Vladimír Malíšek published in JMO 10/2005 a commemorating comprehensive text. On the occasion of Dr. Miler's 75th anniversary we present nowadays an interview with him. He plays a decisive role in editing the contents of this journal issue devoted to fibre optics and reflecting the Nobel prize in physics for 2009 awarded to Charles K. Kao.

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