

Micro Optical Components: Efficient Manufacturing by Ion Exchange Processes

During the last 10 years the research group of Prof. Griese has been working intensively on the development of a novel hybrid electrical-optical interconnection technology on the printed circuit board level. Based on the experience gained in many national collaborative research projects (e.g. NeGit, FutureBoard) funded by the BMBF this research project is focused on modeling and optimization of ion exchange processes for the manufacturing of passive optical components such as waveguides (figure 1), power splitter and micro lenses in thin glass sheets.

The collaborative project „Modeling and Optimization of Ion Exchange Processes for the Manufacturing of

Optical Components with Graded Index Profiles in Thin Glass Sheets“ started in the end of 2011 and is funded by the DFG. In collaboration with the TU Berlin a thermal and a field supported ion exchange process for the realization of graded index waveguides is investigated experimentally and by modeling and simulation techniques (figure 2) in order to get a deep and fundamental understanding of the physical and chemical processes. The overall aim of the project is to determine the process parameters by simulation in such a way, that passive optical components with predefined optical properties can be manufactured by an ion exchange process in thin glass.



Fig. 1

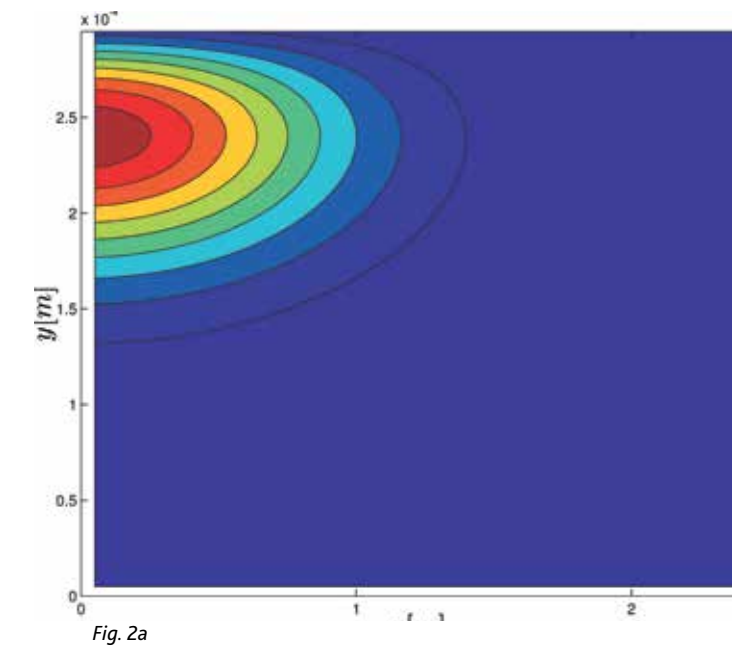


Fig. 2a

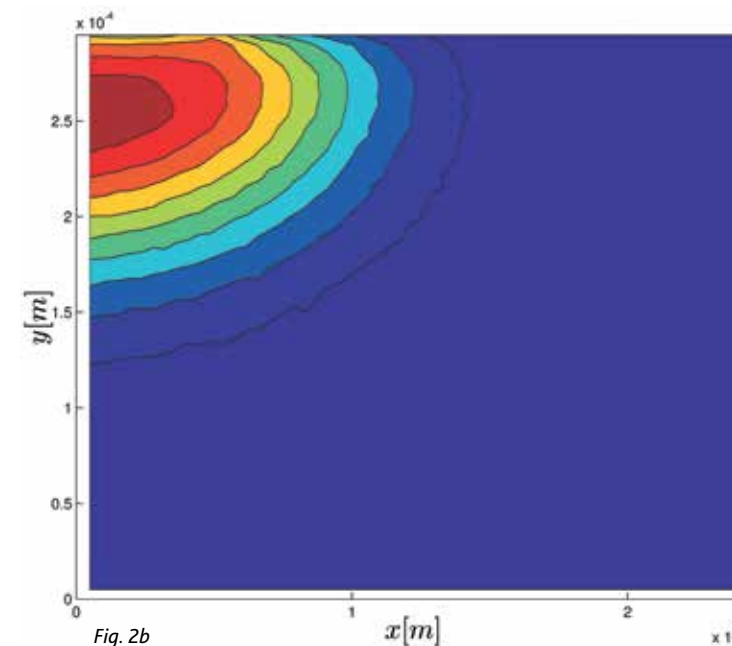


Fig. 2b

Fig. 1
Cross section of a thin glass sheet with integrated graded index waveguides manufactured by an ion exchange process

Fig. 2
Ion density in the cross section of a graded index waveguide obtained by
a.) Simulation of the ion exchange process
b.) Calculation from the measured refractive index profile

I Project Management and Execution

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