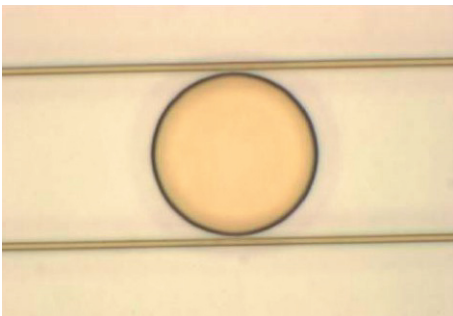


INTEGRATED OPTICS DEVICES

Integrated Optics

Research from the beginning of 1990's at the University of Twente (MESA⁺ Research Institute) has resulted in a worldwide-recognized competence in integrated optics in general and in SiO_xN_y high index contrast waveguides in particular. The intellectual property rights of this technology have been transferred to LioniX BV for commercialization purposes.



Ring resonator applicable for filtering, switching and sensing functions (diameter 50 μm)

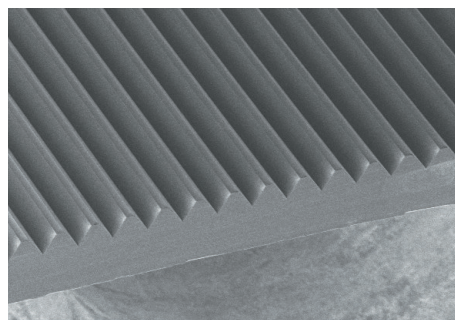
The relative small dimensions compared to 'conventional' SiO₂, and the inherent possibility to combine this technology with micromachining technologies (MOEMS), are the main features. Etched V-grooves make ideal fiber-to-chip coupling structures possible and enables coupling with existing silicon based photonics devices such as photodiodes as well.

The combination of SiO_xN_y waveguides with proprietary ZnO thin film technology allows very fast and low power active electro-optical modulation, compared to the common thermo-optic actuation.

Datacom applications

Applications as mobile telephones and the Internet have brought about an enormous increase in the data communication demand. Replacement of electrical functions by optical ones and the

potentials of miniaturization form the driving force for the development of optical components for the Telecom infrastructures, such as optical cross connects and modulator/demodulator devices.

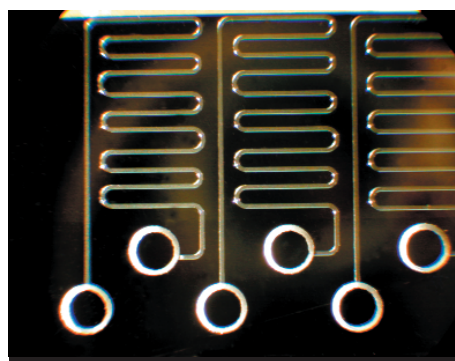


V-groove substrate for fiber array (pigtailing)

Lab-on-a-Chip

Another emerging application area is optical sensor and detection systems in Life Sciences (genomics & proteomics, pharma, medicine, food) and Industrial Process Control (fine chemistry, bioprocessing). With help of microfluidics technology complete miniaturized analysis systems are in development, in which optical sensing and fluidic control are combined. Systems based on Lab-on-a-Chip promise to be responsible for a revolutionary change in (bio)chemical processes and analysis.

Microfluidic flow-through cell with Young interferometer; in- and output and fluidic channels (left), interaction with red light beam (right) (Courtesy of MESA⁺)



Our expertise

- slab and ridge waveguides with high or low index contrast, index tuning (0.001) and low attenuation characteristics
- gratings, junctions, tunable narrow bandwidth filters, TE/TM filters and control of birefringence
- electro-optical actuation based on ZnO integration
- combination with MEMS technologies such as Deep RIE etching, electrode structuring and wet etching to fabricate active components (MOEMS)
- nanophotonics, through the link with MESA⁺

References

Projects in this area are being executed for big organizations such as ESA/Netherlands Aerospace Agency, Linde (CH), Pirelli (It), in the framework of EC-projects and for numerous smaller innovative companies and telecom start-ups in Europe, Israel, Canada and the USA.

