

Press Release 03/2017

Fast and small spectral sensors for fiber-Bragg gratings

With stacked silicon photodiodes and refined optical thin film filters, spectrally sensitive detectors can be developed that can replace conventional, expensive spectrometers needed for special applications. A further feature of such spectral sensors is the elimination of measurement errors caused by undesirable polarization of the radiating source when fiber-optical sensors are used.

The MEMS technologies available and refined at CiS Research Institute were the basis for the development of a new generation of spectral sensors consisting of two detector chips stacked on top of another, each covering a specific spectral range. The upper diode is only 50 µm thin.

The compact assembly of the detector chips including filters, beam shaping elements, fiber coupler as well as electronics and housing allows a minimum sensor size just slightly larger than an ordinary APC connector. The opto-electronic converter is also available as an SMD component. The contacts are located on the back of the chip and enable the undisturbed incidence of light on the detector.

The new solution concept targets applications with a small wavelength range to be monitored. Narrow-band filters provide picometer accuracy when detecting the wavelength shifts. In addition, vibrations up to 1 MHz are measurable time-resolved with low noise.

Based on the developed micro-technologies and the proven system design a variety of customized sensor solutions can be implemented, for example for the monitoring of bridges, wind turbines and aircraft wing units or for the measurement of the surface plasmon resonance in biotechnology or pharmacy.

The research and development work in the project 3D-Spek-Sens was funded by the German Federal Ministry of Economics and Energy (Funding Code: MF130140).

Presentation at:

Hanover Fair, 24-28 April 2017, Hanover, hall 4, booth F34

SMT Hybrid Packaging, 16-18 May 2017, Nuremberg, hall 4A, booth 318B

SENSOR+TEST, 30 May – 1 June 2017, Nuremberg, hall 1, booth 1-150

About CiS Forschungsinstitut für Mikrosensorik GmbH

CiS Research Institute for Microsensor Systems GmbH is a leading R & D provider in the fields of optical, micromechanical and piezoresistive sensors as well as silicon detectors. It employs more than 100 employees and supports companies in the development of customized solutions in the

Press Release 03/2017

Download text and photos in print-ready resolution at www.cismst.org in section "News / Press Information"

fields of sensor and microsystem technology and manufactures these in small batches. Basis is the silicon technology with the specialties: 3D structuring, stacking technologies and double-sided wafer processing.

Press contact:

CiS Forschungsinstitut für Mikrosensorik GmbH, 99099 Erfurt, Germany
Uta Neuhaus | Phone.: +49 361 663 1154 | E-Mail: uneuhaus@cismst.de | www.cismst.de

*Photos for free publication in connection with the content of this press release
(© CiS Forschungsinstitut für Mikrosensorik GmbH)*

Pictures



Figure 1: Spectral sensor with APC connector