POLYMER PHOTONIC STRUCTURES FOR LAB-ON-FIBER APPLICATIONS

Martincek I., Goraus M., Kacik D.

Dept. of Physics, Faculty of Electrical Engineering, University of Žilina, Univerzitná 1, 01026, Žilina, Slovakia

Integration progress based on microfluidics and biophotonics issued in implementation of many sensors in single chip. This leaded to starting new area where analysis and point-of-care diagnosis can be realized on chip laboratory known as lab-on-a-chip. In vivo biosensing still requires a sensor probes able to perform measurements at precise locations. The intrinsic property of optical fibers to guide light to a remote location makes them an ideal platform and led to the development of the so-called lab-on-fiber (LOF) technology.

Here, we proposed a photonic structures and optical components based on polymers which could be integrated and employed as sensors on the tip of the optical fiber. We focused on fabrication of photonic elements as Fabry-Pérot interferometer and Bragg gratings in three-dimensional (3D) arrangement. For the fabrication we used 3D laser lithography based on two-photon polymerization process. Fabricated structures integrated on the tip of the optical fiber were characterized by spectral optical measurements where we documented the sensing properties of such photonic components for LOF.

Acknowledgement: This work was supported by the Slovak National Grant Agency under the projects no. VEGA 1/0540/18 and VEGA 1/0278/15, the Slovak Research and Development Agency under the project No. APVV-16-0129.