Photonics as a useful tool from medicine to gas supply systems

Mirosław A. Karpierz*

Faculty of Physics, Warsaw University of Technology, Koszykowa 75, 00-662 Warszawa

Received September 29, 2011; accepted September 29, 2011; published September 30, 2011

Abstract—A brief editorial overview of the current issue is presented. This number of Photonics Letters of Poland contains 12 regularly submitted letters showing wide applications of optical and photonic methods.

In the first letter published in the current issue (paper by Kauppila *et al.*) the demonstration of trapping and rotation red blood cell aggregates by optical tweezers is reported. Applications of optics and photonics in medicine are very important and the presented results are interesting as well as spectacular, thus we decided to put the photo of red blood cell aggregates from the paper on the front cover.

The next letters are devoted to various kinds of materials used in photonics and/or measured by optical methods. All of these materials have a great significance in current and prospective applications. They are as follows: porous TiO_2 used in photovoltaics (papers by Iwulska and Śliwiński, where the preparation and results of measurements are presented), gold nanostructures with plasmonic properties (the paper by Grochowska and Śliwiński, showing the preparation and spectral properties), strontium lanthanum gallate as promising substrate for high temperature superconducting films (the paper by Barzowska *et al.,* with results of absorption and luminescence measurements at different temperature and pressure), copper phthalocyanine used in photovoltaic devices (the paper by Signerski and Jarosz with diffusion length measurements obtained from the photocurrent spectrum), pyrrole molecules – a building block of many biologically important compounds (the paper by Wasowicz *et al.,* presenting fluorescence emission spectroscopy measurements), gold nanoparticles coated by thiols (the paper by Lesiak and Wójcik, where the nonlinear refractive index was measured by the z-scan technique). To this group can be also included the numerical analysis of self-organized dielectric eutectic structure with parameters taken from SEM microphotographs (the paper by Mossakowska-Wyszyńska *et al.*).

Another group of papers present analysis, design and result of measurements of optical elements, devices and systems. In the publishing order they are: the electro-optic Mach-Zechnder interferometer as an important element in optical communication networks (numerical modelling in the paper by Singh *et al.*), compact microinterferometer based on diffractive optical elements for measurements of fabricated microelements (the paper by Jóźwik *et al.* presenting design, numerical analysis and preliminary experimental results), optical sensor systems for monitoring a gas pipeline network (the paper by Domański *et al.,* containing the description of the system and results of laboratory tests), and polarization sensitive optical coherent tomography used for investigating complex objects like printed electronic parts or polymer composites (the paper by Strąkowski *et al.*).

Concluding, the contents of these twelve regularly submitted papers illustrate how wide the applications of photonics are and how important they are for the quality of our life.

* E-mail: karpierz@if.pw.edu.pl

