T4: O–3

1,4-Bis(2-methylstyryl)benzene doped PMMA fibre for blue range fluorescent applications

Piotr Miluski[1], Marcin Kochanowicz[1], Jacek Zmojda[1], and Dominik Dorosz[2]

[1] *Bialystok University of Technology, Wiejska 45D, 15-351 Bialystok, Poland,*
e-mail: p.miluski@pb.edu.pl
[2] *AGH University of Science and Technology, 30 Mickiewicza Av., 30-059 Krakow, Poland*

Nowadays, organic luminescent materials are especially attractive for new applications due to the high efficiency of energy conversion. A new class of organic luminescent dyes and polymers are intensively investigated. In such circumstances, growing interest of dyes doped luminescent optical fibers for blue visible radiation range is noticeable. The polymeric host optical fibre technology seems to be excellent for that purposes since organic dyes can be directly incorporated into the polymer chain structure.

In the paper, the 1,4-Bis(2-methylstyryl)benzene was used for poly(methyl methacrylate) PMMA fibre doping. The bright, multi-peak (422, 450, 488 nm) fluorescence spectrum of the bulk specimen under UV excitation was observed. The multi-peak emission was also observed in PMMA fibre. Moreover, the energy conversion in polymeric optical fibre leading to significant spectrum shape modification. The first (428 nm) peak is strongly attenuated since reabsorption plays a significant role in spectrum shape formation and the third peak (488 nm) is dominant in recorded spectra for fiber longer than 40 cm. The fluorescence spectra and signal attenuation in PMMA fibre are discussed too.

The presented fluorescence spectrum shape modification in PMMA fibre can be useful in a wide range of compact light sources and sensor constructions.

Keywords: polymeric optical fibre; poly(methyl methacrylate);1,4-bis(2-methylstyryl)benzene; fluorescence

Acknowledgment
This work was supported by Bialystok University of Technology project No. S/WE/4/2013, Poland and under EU COST Action MP1401 "Advanced fibre laser and coherent source as tools for society, manufacturing and life science".