

The scope of the scientific project including receiving glasses and glass fibers doped with transition metal and/or rare earth ions for white light emission and near-infrared radiation is located in the modern trends of research for optoelectronics and advanced optical materials.

The objectives of the project are: synthesis of oxide and oxyfluoride glasses containing transition metal and/or rare earth ions, thermal and structural properties of glasses, fabrication of active fibers with respect to influence of technological parameters on glass fiber forming and optical properties, investigations of energy transfer processes and their mechanisms between transition metal and/or rare earth ions in glasses and active fibers and determination of energy transfer efficiencies as a function of donor and acceptor concentrations. The energy transfer processes in glasses and active fibers will be examined in relation to practical applications for white light emission and near-infrared radiation at 2000 nm. The following structural, thermal and optical investigations are planned: X-ray diffraction analysis (XRD), differential scanning calorimetry (DSC), FT-IR and Raman spectroscopy as well as methods using optical spectroscopy (absorption, excitation, luminescence, lifetime measurement, refractive index measurement) for determination of spectroscopic parameters important for energy transfer processes.

The scientific scope of the project deal with study of energy transfer processes and their mechanisms between transition metal and/or rare earth ions in glasses and active fibers. Based on experimental data and theoretical calculations, glasses and glass fibers promising for white light emission and near-infrared luminescence at 2000 nm will be selected. There are some problems, which are interesting not only from the scientific point of view. In practice, the obtained results may be important for oxide and oxyfluoride glasses and active fibers emitting white light and near-infrared radiation. We assume that the luminescence of rare earth ions in glasses and glass fibers will be enhanced through strong sensitization of transition metal ions and efficient energy transfer process.