

Luminescent thermometry is currently the unique measurement technique that enables contactless temperature determination of both the surface and inside the object. For this purpose, the light emitted by the nano-objects surrounding the examined element is analyzed. This technique can be extremely useful in microelectronics, photonics, but also in diagnostics and therapy of many diseases, in particular in cancer treatment. Some types of nanoparticles are not only capable of determination of local temperature inside the body, but also reveal the ability to heating the objects to which they are attached. This feature in cancer therapy may allow overheating of cancer cells (whose the thermal tolerance is lower in respect to healthy cells) with minimal damage to healthy ones. However, in order to not damage or kill the cells surrounding the tumor and more distant parts of the body, it is necessary to preserve the highest sensitivity of the luminescent thermometer to temperature changes in real time. The known methods of luminescence thermometry have certain limitations, which makes the reached temperature resolution unsatisfactory. Therefore, research in this field is still being carried out to improve measurement methods and increase the application potential of this technique. As part of the project, research to broaden the knowledge of the recently presented revolutionary method of luminescence thermometry, which is characterized by the best reliability and the highest sensitivity to temperature changes, will be carried out. The results of the proposed technique will not only improve the quality and facilitate the temperature readout, but also significantly reduce the cost of the equipment used in the measurement experiment.