Description for the general public

The use of phosphors doped with lanthanide ions for non-contact temperature measurement is in many cases the only form of fast and accurate diagnostics of components exposed to high temperature operation. One of the most important limitations of this type of phosphors is the low absorption cross section of lanthanide ions, which significantly lowers their emission intensity. The intensity of their luminescence can be increased by introducing additional dopant in the form of transition metal ions of much higher absorption cross section. In addition, the use of transition metal ions will increase the sensitivity of this type of luminescent thermometers to temperature changes. The aim of the project is to investigate the mechanism of this sensitization to intentional design high-brightness microcrystalline luminescent thermometers.