Luminescence properties of metal oxides nanostructures, coatings and ceramics

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Recently, the progress on synthesis of nanostructured materials was achieved. For example, the different technique were developed and used for nanoparticles, nanowires, nanocoatings preparation. However for the nanomaterial practical application the studies of properties and characteristics, including optical, are required.

The luminescence characteristics of ZnO [1], ZrO_2 [2,3], TiO_2 and Al_2O_3 were studied. The samples in a form of nanopowders, coatings and ceramics were studied by using high resolution time-resolved luminescence method.

The nanostructures were doped with Eu and Eu^{3+} luminescence was used as a probe of crystal field and local structural disorder.

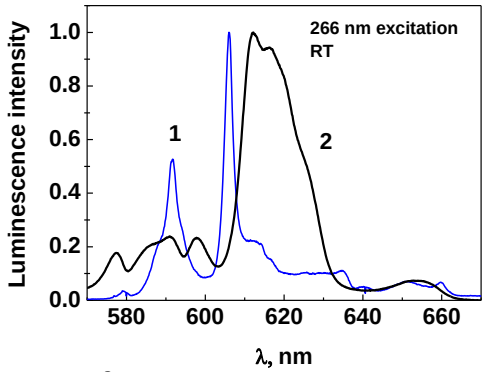

Fig.1. Eu^{3+} center luminescence of ZrO_3:Eu nanopowder (1) and Al_2O_3:Eu coating (2), obtained by plazma electrochemical oxidation.

All samples were tested as prospective materials for luminescence oxygen sensor as well as for radiation transformer application.

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