WATER SOLUBLE AFTERGLOWING ZIRCONIA NANOPARTICLES FOR PHOTOIMAGING OF BIOSYSTEMS

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Phosphor materials that can temporarily store the energy of visible or ionizing radiation by separating and storing the photocreated charge carriers have a great applied importance. A gradual release and recombination of the charge carriers leads to a delayed luminescence (afterglow). The applications of such afterglowing nanoparticles for imaging in biosystems and photodynamic activation are becoming more and more popular [1]. For the implementation, it is critical to have water soluble nanoparticles. However, the synthesis of required afterglowing nanoparticles is a challenging task because most of them have complex composition and cannot be synthesized using low temperature chemical routes.

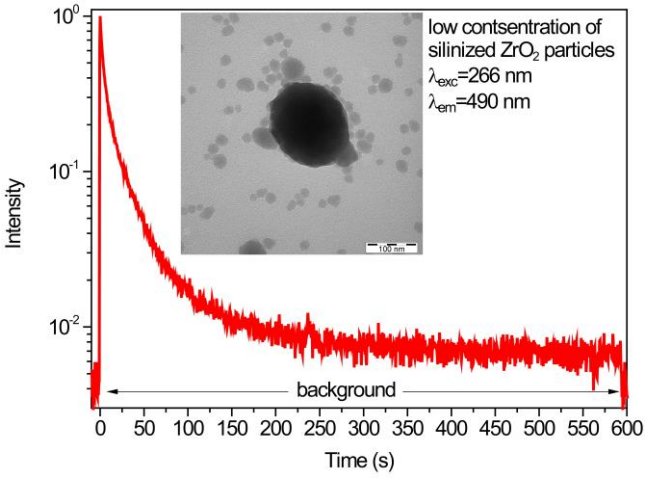

Fig.1 The decay of the PL afterglow of the ZrO_2 particles in water colloid at room temperature after irradiation at 266 nm for 3 min. Inset shows the TEM image of the ZrO_2 particle covered with silica.

Hereby crystalline zirconia (ZrO_2) nanoparticles are proposed as a promising afterglowing material for the aforementioned applications [2]. We found that the dispersibility of sol-gel prepared nanoparticles in water was greatly enhanced by coating them with the layer of amorphous SiO_2 whereas a sufficient afterglow capability was preserved.

References

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