

## YSO:Ce Powder for Composite Scintillators

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The usage of the large-sized bulk single crystals of the oxide materials is limited by their scarcity. Composite scintillators based on fine powders placed in the coupling optical medium can be used as material for production of the cheap detection devices with high overlap surface. A sol-gel method for the production of such materials is an alternative to the complicated technologies of growing bulk single crystals.

The purpose of the current work consisted in the development of the methods of obtaining of scintillation powders for the production of the composite scintillators with the registration efficiency comparable with that of the single crystals of the same materials. The fine powders of the  $Y_2SiO_5:Ce$  (YSO:Ce) composition were chosen for the current research because of the application of the current scintillation material in different types of detectors, such as the detectors of the  $\gamma$ -radiation and the HEP experiments.

The powders of the YSO:Ce compositions were synthesized via sol-gel process. The granular and phase composition of the obtained materials were studied. The composite scintillators based on the mentioned powders were manufactured with the usage of the radiation-resistant polysiloxane elastomer as the coupling medium [1]. The spectral-kinetic and scintillation parameters of the produced composite samples were studied. The obtained data were compared with parameters for YSO:Ce single crystals. The scintillation efficiency of the composite scintillators produced from the powders obtained by a sol-gel method is appropriate for their application in the counting detectors and the detectors for the HEP experiments.

- [1] A.Yu. Boyaryntsev, N.Z. Galunov, N.L. Karavaeva, A.V. Krech, I.V. Lazarev, L.G. Levchuk, T.A. Nepokupnaya, V.D. Panikarskaya, V.F. Popov, P.V. Sorokin, O.A. Tarasenko, Study of radiation-resistant gel bases for composite detectors, *Functional Materials* **20**(4) (2013) 471-476.