Modifying the luminescence characteristics of Lu_2O_3:Eu large nanocrystals with polycarbonate host.

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Streszczenie

Lu_2O_3:Eu phosphor fine powder with average size of crystallites of about 100–150 nm was synthesized. TEM images proved only an insignificant agglomeration of the phosphor. Using these fine particles and commercial polycarbonate a composite material was prepared in a form of 2 mm thick plate and its spectroscopic properties were compared to the powder. While the emission and luminescence excitation spectra were found very similar in both types of materials, the decay times of the Eu^{3+} red luminescence appeared to drop from 1.8–2 ms for the powder to 0.9–1 ms for the composite, with the latter value being perfectly the same as for the coarse-grained sintered translucent ceramics. Since the refractive indices of Lu_2O_3 host and the polycarbonate are 1.935 and 1.582, respectively, such a drastic change in the Eu^{3+} emission kinetics could not be fully explained by the variations of this parameter only. This result is with some disagreement with previously published data. POLYM. COMPOS., 37:1330–1334, 2016. © 2014 Society of Plastics Engineers.

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