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Numerical Simulation of Light Extraction from Remote Phosphor LED

S.N. Lipnitskaya[1], I.I. Dudko[2,3], I.G. Smirnova[1]

[1] Laboratory of Single-Photon Detectors and Generators, ITMO University, Kronverkskiy pr., 49, lit. A, St. Petersburg, 197101, Russia
[2] École Centrale de Lyon, CNRS, INSA Lyon, Université Claude Bernard Lyon 1, CPE Lyon, INL, UMR 5270, 69130 Écully, France
[3] School of Engineering, RMIT University, Melbourne 3001, Victoria, Australia

Received: September 21, 2022 Corresponding author: S.N. Lipnitskaya

Abstract. In this paper, light extraction from remote phosphor LEDs were calculated in Zemax OpticStudio. The dependence of the optical characteristics of the remote phosphor LED on the parameters of phosphor and its geometrical form was considered. In case of a thin plate as a remote phosphor, phosphor particle size, phosphor mass fraction and phosphor plate thickness were carefully analyzed. Furthermore, a plane-convex lens and Fresnel lens were also considered as geometrical form of remote phosphor. The simulation results show that color coordinates of LED, using remote phosphor plate (thickness 0.25 mm, mass fraction 30% and particle size 3 μm of phosphor), are the closest to D65 point on color space compared to other considered LEDs. The use of plane-convex lens (thickness 1 mm, radius of curvature 7 mm, base diameter 7 mm) as remote phosphor results in the maximum luminous flux compared to other forms.

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