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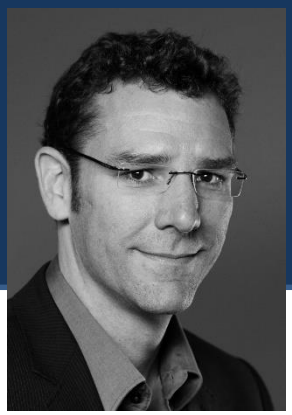

Performance of light sources based on laser excited phosphor conversion

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Light–generating devices based on phosphor conversion have significantly evolved on a scale of output flux and white light luminance and extend to the range where competition with the brightest arc discharge–based sources is ongoing. Solid state light sources are unique in that they can provide both an expanded emission spectrum and high luminance. The efficiency of high luminance semiconductor pumped phosphor sources depends not only on efficient generation of primary radiation from the semiconductor (LEDs or laser diode), but also strongly on the conversion material which is being pushed to optical and thermal limits. The rationale and basic principles behind such sources based on luminescence conversion of laser pump sources are reviewed, along with main applications and market need considerations for such devices. Critical materials characteristics and physical mechanisms that control overall source performance will be discussed, also the expected interplay of material characteristics and laser conversion performance. We have separated contributions from thermal and non–thermal quenching mechanisms, and point out the distinction between the true loss mechanisms (e.g. Auger–like or excited state absorption related) and the decline in converted light output due to increased transparency for the pump light (due to activator ground state depletion). The main challenges and outlook on future will be briefly discussed: where is the laser based lighting expected to continue from here?

SHORT BIO:

Dr. Matthias Sabathil is currently the Global Head of Product Development General Lighting in OSRAM Opto Semiconductors (Malaysia) Sdn. Bhd. He has been working in OSRAM for 14 years and 4 months. His journey with OSRAM started in 2004 as a development engineer in OSRAM Regensburg, Germany. After 5 years, he was promoted to become the Senior Manager in Modeling, who was the leader for a team to support projects with multi–physics simulations. In year 2012, Dr. Matthias became the Director for Predevelopment. He was the Head of Advanced Concepts and Engineering Department, heading a department of five groups from epitaxy, chip technology, phosphors to packages and modeling with the mission to create, research and advance novel concepts for future products. At present, Dr. Matthias is responsible for the product development within the OSRAM segment general lighting.

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