

White light generation with high CRI

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White light emitting diodes (WLEDs) are widely used and very important as they significantly reduce global energy demand and contribute to reducing the use of fossil fuels. These products are characterized by high lighting efficiency, low energy consumption, reliability, and are environmentally friendly. Lighting plays an indispensable role in the everyday life of every human being, and electric light sources are responsible for energy consumption of up to 1/5 of the world's electricity production. LED technology, despite many advantages, also has disadvantages. LED lighting available for sale emits light with an unpleasantly "cold" color. Excessive exposure to blue light disrupts the human circadian cycle, including the production of the sleep hormone melatonin. Therefore, the search for artificial light as close as possible to the spectrum of sunlight is one of the most important and urgent challenges faced by advanced science and technology.

During the conference, we will present an innovative method of producing white WLED light with a high color rendering index (CRI) above 90. In our solution, white light is generated by a composite containing two phosphors excited by violet light with CRI 92 and CCT 2550 K. The electroluminescence spectrum covers the entire visible range from 400 nm to 750 nm. The lack of dominance of the blue component and the presence of a band in the red spectral range make this light healthy for the human body. The color of the generated light, the CRI value, and the CCT color temperature can be modified by changing the proportions between the phosphors used. The obtained composites are stable and have successfully passed aging tests that lasted 10,000 hours. It can be used as lighting for home, public, and industrial spaces as well as high-quality specialist lighting, e.g. during surgical procedures. People should realize that good quality light is as important as clean air or a healthy lifestyle.

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