

The invention of high efficient blue LEDs and future Solid State lighting

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Abstract

In 1970's and 80's, an efficient blue and green light-emitting diodes (LED) were the last missing elements for solid-state display and lighting technologies due to the lack of suitable materials. By that time, III-nitride alloys was regarded the least possible candidate due to various "impossible" difficulties. However, a series of unexpected breakthroughs in 1990's totally changed people's view angle. Finally, the first high efficient blue LEDs were invented and commercialized at the same time of 1993. Nowadays, III-nitride-based LEDs have become the most widely used light source in many applications. The LED light bulbs are more than ten times efficient than incandescent bulb, and they last for 50 years! At their current adoption rates, by 2020, LEDs can reduce the world's need for electricity by the equivalent of nearly 60 nuclear power plants. The history of the invention of blue LED and future lighting will be described.