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## Recent advances in rare earth doped alkali-alkaline earth borates for solid state lighting applications

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### Abstract

As a novel class of inorganic phosphor, the alkali-alkaline earth borate phosphors have gained huge attention due to their charming applications in solid-state lighting (SSL) and display devices. The current research drive shows that phosphors based on the alkali-alkaline earth borates have transformed the science and technology due to their high transparency over a broad spectral range, their flexibility in structure and durability for mechanical and high-laser applications. Recent advances in various aspects of rare-earth (RE) doped borate based phosphors and their utilizations in SSL and light emitting diodes are summarized in this review article. Moreover, the present status and upcoming scenario of RE-doped borate phosphors were reviewed in general along with the proper credential from the existing literature. It is believed that this review is a sole compilation of crucial information about the RE-doped borate phosphors in a single platform.

**Keywords:** Rare-earth; mixed borate, phosphors, photoluminescence, solid-state lighting, LEDs.

### 1. Introduction and Overview

The technological revolutions of light emitting diodes (LEDs) was started in the 19<sup>th</sup> century. The first light emitting diode based on a SiC junction diode has been reported by H. J. Round in the year 1907 [1]. In the year 1927, Losev detected emission from ZnO and SiC diodes [1-2]. The discoveries and progress in LED technologies were not really known until 1930 and most of the discoveries were ignored. Two important developments in semiconductor electroluminescence have directed research and application towards the generation of visible

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