Effects of a current-blocking layer with a metallic reflector on GaN-based light-emitting diodes

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ABSTRACT

Light-emitting diodes (LEDs) are well-developed gradually in recent years; therefore, LED lighting has become the future trend in the lighting market. The major challenge is how to produce high-brightness white LEDs. The improvement of epitaxy has enhanced the brightness and efficiency significantly, and the technique of surface roughening also improved the light extraction efficiency. However, the light beneath p-type electrode is absorbed by the electrode and the effect of current crowding reduces the efficiency, which is a critical issue in large-area LEDs because of the larger power losses. In order to solve the above problems, this thesis investigates the current-blocking layer with a metallic reflector for GaN-based LEDs with surface roughening. The results show that the optical output power is increased by 10.8% than the conventional surface-roughening LEDs.

Keywords : current-blocking layer、reflective layer、surface roughening

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