VERTICAL LIGHT EMITTING DIODE WITH PHOTONIC NANOSTRUCTURES AND METHOD OF FABRICATION THEREOF

ABSTRACT

There is provided a method of fabricating a vertical light emitting diode which includes forming a light emitting diode structure. Forming the light emitting diode structure includes: forming a first material layer of a first conductivity type, forming a second material layer of a second conductivity type, forming a light emitting layer between the first material layer and the second material layer, and forming a plurality of generally ordered photonic nanostructures at a surface of the first material layer through which light generated from the light emitting layer is emitted for enhancing light extraction efficiency of the vertical light emitting diode. In particular, forming a plurality of generally ordered photonic nanostructures includes forming a self-assembled template including generally ordered nanoparticles on the surface of the first material layer to function as a mask for forming the photonic nanostructures at said surface of the first material layer. There is also provided a vertical light emitting diode with the self-assembly derived ordered nanoparticles.

FIG. 1B

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There is provided a method of fabricating a vertical light emitting diode which includes forming a light emitting diode structure. Forming the light emitting diode structure includes: forming a first material layer of a first conductivity type, forming a second material layer of a second conductivity type, forming a light emitting layer between the first material layer and the second material layer, and forming a plurality of generally ordered photonic nanostructures at a surface of the first material layer through which light generated from the light emitting layer is emitted for enhancing light extraction efficiency of the vertical light emitting diode. In particular, forming a plurality of generally ordered photonic nanostructures includes forming a self-assembled template including generally ordered nanoparticles on the surface of the first material layer to function as a mask for forming the photonic nanostructures at said surface of the first material layer. There is also provided a vertical light emitting diode with the self-assembly derived ordered nanoparticles.

FIG. 1B