Claims

1. A method of forming a light emitting structure comprising:

forming a first light emitting diode comprising a first light emitting region configured to emit light having a first primary peak wavelength;

forming a second light emitting diode comprising a second light emitting region configured to emit light having a second primary peak wavelength, wherein the first primary peak wavelength is different to the second primary peak wavelength;

wherein forming at least one of the first light emitting diode and the second light emitting diode comprises growing a plurality of epitaxial crystalline layers comprising at least part of a partially reflective layer;

bonding the first light emitting diode to the second light emitting diode with an insulating bonding layer such that the partially reflective layer is positioned at least partially between the first light emitting region and the second light emitting region, wherein the partially reflective layer is configured to reflect light having the first primary peak wavelength emitted by the first light emitting region and allow light having the second primary peak wavelength emitted by the second light emitting region to pass through the partially reflective layer, wherein the partially reflective layer comprises a Distributed Bragg Reflector comprising alternating epitaxial crystalline layers with different porosities; and

forming an electrode pair for each of the first light emitting diode and the second light emitting diode, thereby to enable independent control of light emission from each of the first light emitting region and the second light emitting region, wherein forming an electrode of the electrode pair comprises etching a via, forming an insulating surface on at least part of the inner wall of the via and forming a conductor at least partially within the via.

2. The method according to claim 1, wherein the second primary peak wavelength is longer than the first primary peak wavelength.

3. The method according to any preceding claims, wherein forming the light emitting structure comprises forming a primary light emitting surface area wherein the light

having the first primary peak wavelength and the second primary peak wavelength are emitted from the light emitting structure via the primary light emitting surface area.

4. The method according to any preceding claims, wherein the light emitting structure comprises a third light emitting region configured to emit light having a third primary peak wavelength, wherein the third primary peak wavelength is different to the first and second primary peak wavelengths, wherein the method comprises bonding a third light emitting device comprising the third light emitting region configured to emit light having the third primary peak wavelength to the first light emitting device comprising the first light emitting region configured to emit light having the first primary peak wavelength and/or the second light emitting device comprising the second light emitting region configured to emit light having the second primary peak wavelength.

5. The method accordingly to claim 4, wherein the third light emitting device is a light emitting diode device comprising a light emitting region, an n-type region and a p-type region, wherein the third light emitting region comprises at least one epitaxial quantum well and a second partially reflective layer positioned at least partially between the second light emitting region and the third light emitting region, wherein the partially reflective layer is configured to reflect light having the first primary peak wavelength emitted by the first light emitting region and light having the second primary peak wavelength emitted by the second light emitting region and allow light having the third primary peak wavelength emitted by the third light emitting region to pass through.

6. The method according to any preceding claims, wherein bonding comprises using a handling device to facilitate positioning of the first light emitting device in relation to the second light emitting device.

7. The method according to any preceding claims, wherein the first light emitting device comprises a substrate, the method comprising removing the substrate of the first light

emitting device thereby to provide a surface for bonding the first light emitting device to the second light emitting device.

8. The method according to any of claim 6 or 7, comprising removing the handling device after the first light emitting device and the second light emitting device have been bonded together.

9. The method of any preceding claims, comprising disposing a transparent conductive layer on the first light emitting device.

10. The method of any of claims 7 to 9, when dependent on claim 6, wherein the handling device is bonded on the opposite side of the light emitting structure to a substrate.

11. The method according to any preceding claims, wherein the light emitting structure comprises a Gallium Nitride based structure.

12. The method according to any preceding claims, wherein the light emitting structure is at least partially grown by metalorganic chemical vapour deposition.

13. The method according to any preceding claims wherein the alternating epitaxial crystalline layers with different porosities comprise epitaxial Gallium Nitride layers with different porosities.

14. The method according to claim 13 wherein the alternating epitaxial crystalline layers are formed as part of a continuous growth process with at least one of the first and second light emitting regions.

15. A light emitting structure comprising:

a first light emitting diode comprising a first light emitting region configured to emit light having a first primary peak wavelength;

a second light emitting diode comprising a second light emitting region configured to emit light having a second primary peak wavelength, wherein the first primary peak wavelength is different to the second primary peak wavelength; wherein

at least one of the first light emitting device and the second light emitting device comprises a plurality of epitaxial crystalline layers comprising at least part of a partially reflective layer, wherein the first light emitting diode is bonded to the second light emitting diode with an insulating bonding layer such that the partially reflective layer is positioned at least partially between the first light emitting region and the second light emitting region, wherein the partially reflective layer is configured to reflect light having the first primary peak wavelength emitted by the first light emitting region and allow light having the second primary peak wavelength emitted by the second light emitting region to pass through the partially reflective layer, wherein the partially reflective layer comprises a Distributed Bragg Reflector comprising alternating epitaxial crystalline layers with different porosities, wherein the light emitting structure comprises an electrode pair for each of the first light emitting diode and the second light emitting diode, wherein one or more of the electrodes of the electrode pairs comprises a via hole comprising an insulating surface on at least part of the inner wall of the via hole and a conductor at least partially within the via hole.

16. The light emitting structure according to claim 15, wherein the second primary peak wavelength is longer than the primary peak wavelength.

17. The light emitting structure according to any of claims 15 and 16, wherein the light emitting structure comprises a primary light emitting surface area wherein the light having the first primary peak wavelength and the second primary peak wavelength are emitted from the light emitting structure by the primary light emitting surface area.

18. The light emitting structure according to any of claims 15 to 17, wherein the light emitting structure comprises a first light emitting device comprising the first light emitting region configured to emit light having the first primary peak wavelength that is bonded to a second light emitting device comprising the second light emitting region configured to emit light having the second primary peak wavelength, wherein the first light emitting device and the second light emitting device are light emitting diode devices each comprising a light emitting region, an n-type region and a p-type region,

wherein the first light emitting region and the second light emitting region comprise at least one epitaxial quantum well, wherein at least one of the first light emitting device and the second light emitting device comprises the partially reflective layer.

19. The light emitting structure according to any of claims 15 to 18, wherein the light emitting structure comprises a third light emitting region configured to emit light having a third primary peak wavelength, wherein the third primary peak wavelength is different to the first and second primary peak wavelengths, wherein the third light emitting device comprising the third light emitting region configured to emit light having the third primary peak wavelength is bonded to the first light emitting device comprising the first light emitting region configured to emit light having the first primary peak wavelength and/or the second light emitting device comprising the second light emitting region configured to emit light having the second primary peak wavelength, wherein the third light emitting device is a light emitting diode device comprising a light emitting region, an n-type region and a p-type region, wherein the third light emitting region comprises at least one epitaxial quantum well.

20. The light emitting structure according to claim 19, comprising a second partially reflective layer positioned at least partially between the second light emitting region and the third light emitting region, wherein the partially reflective layer is configured to reflect light having the first primary peak wavelength emitted by the first light emitting region and light having the second primary peak wavelength emitted by the second light emitting region and allow light having the third primary peak wavelength emitted by the third light emitting region to pass through.

21. The light emitting structure according to any of claims 15 to 20, wherein the first light emitting device and/or the second light emitting device comprises a transparent conductive layer.

22. The light emitting structure according to any of claims 15 to 21, wherein the light emitting structure comprises a Gallium Nitride based structure.

23. The light emitting structure according to any of claims 15 to 22 wherein the alternating epitaxial crystalline layers with different porosities comprise epitaxial Gallium Nitride layers with different porosities.