

Claims

1. A method of forming a light emitting structure, the light emitting structure comprising:
 - a light emitting region configured to emit light having a primary peak
5 wavelength;
 - a partially reflective region;
 - a reflective region; and
 - a colour conversion region, wherein the light emitting region is positioned at
least partially between the partially reflective region and the reflective region and the
10 partially reflective region is positioned at least partially between the colour conversion
region and the light emitting region, wherein the partially reflective region is
configured to reflect light of a predetermined range of wavelengths and allow light
outside the predetermined range of wavelengths to pass through the partially
reflective region, wherein the primary peak wavelength is outside the predetermined
15 range of wavelengths, wherein the method comprises:
 - forming a light emitting device comprising the light emitting region on a
substrate;
 - forming the partially reflective region prior to the light emitting region;
 - removing the substrate; and
 - 20 roughening the light emitting structure following removal of the substrate and
prior to forming the colour conversion region on the roughened light emitting
structure.
2. The method according to claim 1, wherein the partially reflective region comprises a
25 Distributed Bragg Reflector.
3. The method according to any preceding claim, wherein the reflective region comprises
a Ag-based mirror.
- 30 4. The method according to any preceding claim, comprising depositing the reflective
region on a light emitting device comprising the light emitting region.

5. The method according to any preceding claim comprising forming undoped material between the substrate and the partially reflective region, wherein roughening the light emitting structure comprises roughening the undoped material.
- 5 6. The method according to any preceding claim, comprising removing the substrate by wet etching.
7. The method according to any preceding claim, comprising bonding a handling device to the reflective region.
- 10 8. The method according to any preceding claim, wherein the light emitting structure comprises a GaN based structure.
9. The method according to any preceding claim, wherein the light emitting region
15 comprises one or more epitaxial quantum wells.
10. The method according to any preceding claim, wherein the light emitting region is configured to emit light with a primary peak wavelength that corresponds to blue light.
- 20 11. The method according to any preceding claim, wherein the predetermined range of wavelengths comprises wavelengths of light longer than 500 nm such that wavelengths shorter than 500 nm are outside the predetermined range of wavelengths.
- 25 12. The method according to any preceding claim, wherein the partially reflective region comprises alternating epitaxial crystalline layers.
13. The method according to claim 12, wherein the alternating epitaxial crystalline layers
30 comprising a semiconductor material with different porosities in the alternating epitaxial crystalline layers.
14. The method according to claim 13, wherein the semiconductor material is GaN.

15. The method according to claim 14 wherein the first and/or last layer of the partially reflective region has a thickness of $1.3\lambda_0/4n$ compared with a thickness of $\lambda_0/4n$ in other layers of the alternating epitaxial crystalline layers, wherein λ_0 is the central wavelength of the predetermined range of wavelengths and n is the refractive index of the layer.
16. A light emitting structure comprising:
- a light emitting region configured to emit light having a primary peak wavelength;
 - a partially reflective region;
 - a reflective region;
 - a colour conversion region; and
 - a roughened region between the colour conversion region and the partially reflective region, the roughened region configured to increase light extraction into the colour conversion region, wherein the light emitting region is positioned at least partially between the partially reflective region and the reflective region and the partially reflective region is positioned at least partially between the colour conversion region and the light emitting region, wherein the partially reflective region is configured to reflect light of a predetermined range of wavelengths and allow light outside the predetermined range of wavelengths to pass through the partially reflective region, wherein the primary peak wavelength is outside the predetermined range of wavelengths.
17. The light emitting structure according to claim 16, wherein the partially reflective region comprises a Distributed Bragg Reflector.
18. The light emitting structure according to any of claim 16 or 17, wherein the reflective region comprises a Ag-based mirror.
19. The light emitting structure according to any of claim 16 to 18, comprising a handling device bonded to the reflective region.

20. The light emitting structure according to any of claim 16 to 19, wherein the light emitting structure comprises a GaN based structure.
- 5 21. The light emitting structure according to any of claim 16 to 20, wherein the light emitting region comprises one or more epitaxial quantum wells.
22. The light emitting structure according to any of claim 16 to 21, wherein the light emitting region is configured to emit light with a primary peak wavelength that
10 corresponds to blue light.
23. The light emitting structure according to any of claims 16 to 22, wherein the predetermined range of wavelengths comprises wavelengths of light longer than 500 nm such that wavelengths shorter than 500 nm are outside the predetermined range
15 of wavelengths.
24. The light emitting structure according to any of claims 16 to 23, the partially reflective region comprises alternating epitaxial crystalline layers.
- 20 25. The light emitting structure according to claim 24, wherein the alternating epitaxial crystalline layers comprising a semiconductor material with different porosities in the alternating epitaxial crystalline layers.
26. The light emitting structure according to claim 25, wherein the semiconductor
25 material is GaN.
27. The light emitting structure according to claim 26, wherein the first and/or last layer of the partially reflective region has a thickness of $1.3\lambda_0/4n$ compared with a thickness of $\lambda_0/4n$ in other layers of the alternating epitaxial crystalline layers, wherein λ_0 is the
30 central wavelength of the predetermined range of wavelengths and n is the refractive index of the layer.