Claims:

1. A device, comprising:

a backplane, the backplane having a plurality of backplane electrodes, each backplane electrode comprising a first material and each backplane electrode contacts the backplane;

a plurality of micro-LEDs having a plurality of micro-LED electrodes, each micro-LED electrode comprising a second material and each micro-LED electrode contacts each micro-LED, wherein each micro-LED electrode is bonded to each backplane electrode with an alloy of the first material and the second material therebetween, the alloy contacts each micro-LED electrode and each backplane electrode; and

a plurality of subpixel isolation (SI) structures formed over the backplane, adjacent SI structures having a micro-LED disposed therebetween.

2. The device of claim 1, wherein the first material includes gold, indium, tin, silver, aluminum, platinum, or combinations thereof.

3. The device of claim 1, wherein the second material includes gold, silver, aluminum, platinum, indium, or combinations thereof.

4. The device of claim 1, wherein the alloy has a ratio of the first material to the second material and the ratio of first material to second material is about 1:3 to about 3:1.

5. A method, comprising:

aligning a transfer piece with a receiving piece, the receiving piece comprising:

a bonder stage;

a backplane disposed on the bonder stage; and

backplane electrodes disposed on the backplane;

heating the transfer piece to a first temperature and heating the receiving piece to a second temperature;

applying pressure to the transfer piece, the transfer piece comprising:

a bonder head;

a plate coupled to the bonder head;

micro-LEDs coupled to the plate; and

micro-LED electrodes coupled to each of the micro-LEDs;

alloying the backplane electrodes with the micro-LED electrodes;

decreasing the second temperature;

applying a clamp to the transfer piece;

applying a laser to the clamp; and

vaporizing an interface between the plate and the micro-LEDs.

6. The method of claim 5, further comprising:

removing the clamp;

forming subpixel isolation (SI) structures on the backplane wherein the SI structures form a well of a sub-pixel; and

forming micro-lenses over the micro-LEDs.

7. The method of claim 5, wherein the first temperature is about 40°C and about 80°C.

8. The method of claim 5, wherein the second temperature is about 150°C and about 300°C.

9. The method of claim 5, wherein the plate is comprised of silicon (Si), silicon carbide (SiC), aluminum nitride (AlN), gallium nitride (GaN), sapphire, or any combination thereof.

10. The method of claim 5, wherein the pressure is about 100 psi and about 600 psi.

11. The method of claim 5, wherein the second temperature is decreased to the first temperature.

12. The method of claim 11, wherein the decreasing the second temperature is performed according to a step function or a linear function.

13. The method of claim 5, wherein the laser is applied in a symmetric pattern.

14. The method of claim 13, wherein the symmetric pattern is initiated at or near an exterior of the clamp.

15. The method of claim 5, wherein the vaporizing an interface layer between the plate and the micro-LEDs separates the micro-LEDs from the plate.

16. The method of claim 11, wherein the second temperature is decreased via cooling channels disposed in the bonder stage.

17. A method, comprising:

aligning a transfer piece with a receiving piece, the receiving piece comprising:

a bonder stage;

a backplane disposed on the bonder stage; and

backplane electrodes disposed on the backplane, each backplane electrode comprising a first material;

heating the transfer piece to a first temperature and heating the receiving piece to a second temperature;

applying pressure to the transfer piece, the transfer piece comprising:

a bonder head;

a plate coupled to the bonder head;

micro-LEDs coupled to the plate; and

micro-LED electrodes coupled to each of the micro-LEDs, the micro-LED electrodes comprising a second material;

forming an alloy of the first material and the second material between the backplane electrodes and the micro-LED electrodes;

decreasing the second temperature;

applying a clamp to the transfer piece;

applying a laser to the clamp; and

vaporizing an interface between the plate and the micro-LEDs.

18. The device of claim 1, wherein a plurality of micro-lenses disposed the plurality of micro-LEDs.

19. The device of claim 18, further comprising a passivation layer disposed over the plurality of micro-lenses.

20. The method of claim 17, further comprising:

removing the clamp;

forming subpixel isolation (SI) structures on the backplane wherein the SI structures form a well of a sub-pixel; and

forming micro-lenses over the micro-LEDs.