Claims

1. A light emitting structure array system with an off-axis micro-lens array structure comprising:

at least one light emitting mesa; and

at least one micro-lens, formed above the light emitting mesa, wherein a central axis of the at least one micro-lens is not coaxially aligned with a central axis of the at least one light emitting mesa.

2. The light emitting structure array system according to claim 1, wherein relative position of each micro-lens relative to a corresponding light emitting mesa in the light emitting structure array system are the same.

3. The light emitting structure array system according to claim 1, further comprising a sensor, wherein emitting light rays from the at least one light emitting mesa through the at least one micro-lens are converted together into the sensor.

4. The light emitting structure array system according to claim 3, wherein the sensor is arranged at a central axis of the light emitting structure array system.

5. The light emitting structure array system according to claim 4, wherein a respective offset distance of a central axis of a respective micro-lens relative to a central axis of a respective light emitting mesa becomes larger from center of the light emitting structure array system to an edge of the light emitting structure array system.

6. The light emitting structure array system according to claims 3, wherein the sensor is not arranged at a central axis of the light emitting structure array system.

7. The light emitting structure array system according to claim 6, wherein an offset distance of a central axis of a respective micro-lens relative to a central axis of a respective light emitting mesa becomes larger from a central axis of the sensor to an edge of the light emitting structure array system.

8. The light emitting structure array system according to claims 6, wherein an angle of light emitted out of a respective micro-lens becomes larger from a central axis of the sensor to an edge of the light emitting structure array system.

9. The light emitting structure array system according to claims 1, wherein an offset range of the central axis of the at least one micro-lens from the central axis of the at least one light emitting mesa is not more than 4.5 μm.

10. The light emitting structure array system according to claims 1, wherein an offset distance between an edge of a bottom surface of the at least one light emitting mesa and an edge of a bottom surface of the at least one micro-lens is within 30% of a diameter of the bottom surface of the at least one micro-lens.

11. The light emitting structure array system according to claims 1, wherein material of the at least one micro-lens is silicon oxide or organic materials.

12. The light emitting structure array system according to claim 1, wherein a bottom surface of the at least one micro-lens intersects with the central axis of the at least one light emitting mesa.

13. The light emitting structure array system according to claim 1, further comprising a semiconductor substrate and a reflective cup, wherein the at least one light emitting mesa is formed on the semiconductor substrate, and the at least one light emitting mesa is surrounded by the reflective cup.

14. The light emitting structure array system according to claim 13, wherein inside wall of the reflective cup is stair-shaped.

15. The light emitting structure array system according to claim 13, wherein the at least one light emitting mesa includes:

a light emitting layer,

a bottom bonding layer, at a bottom of the light emitting layer and bonded with the semiconductor substrate, and

a top electrode layer, covering the at least one light emitting mesa and electrically connected with the reflective cup, wherein the reflective cup is electrically connected with the semiconductor substrate.

16. The light emitting structure array system according to claims 1, further comprising a spacer, formed between the at least one light emitting mesa and the at least one

micro-lens.

17. The light emitting structure array system according to claim 16, wherein height of the spacer is less than height of the at least one micro-lens.

18. The light emitting structure array system according to claim 13, wherein the semiconductor substrate is an IC substrate.

19. The light emitting structure array system according to claim 13, wherein inside wall of the reflective cup comprises multiple sidewalls at different angles.

20. A light emitting structure array system with an off-axis micro-lens array structure comprising:

two or more light emitting mesas; and

two or more micro-lenses, each of the two or more micro-lenses formed above each of the two or more light emitting mesas;

wherein a respective offset distance of a central axis of a respective micro-lens relative to a central axis of a respective light emitting mesa becomes larger from center of the light emitting structure array system to an edge of the light emitting structure array system.