~~What is claimed is:~~Claims

1. A light emitting pixel unit, comprising:

at least one mesa formed on a substrate; and

a micro-lens formed from a micro-lens layer that covers at least a top of the at least one mesa;

wherein:

material of the micro-lens layer is different from material of the at least one mesa, and

the micro-lens layer is in direct physical contact with the at least one mesa.

2. The light emitting pixel unit according to claim 1, wherein the micro-lens forms individually around the top of the at least one mesa.

3. The light emitting pixel unit according to ~~any one of claims 1-2~~ claim 1, wherein a spacer is formed from the same micro-lens layer between the at least one mesa and the micro-lens.

~~4. The light emitting pixel unit according to claim 3, wherein thickness of the spacer is not more than 1 micrometer.~~

~~5.~~4. The light emitting pixel unit according to ~~any one of claims 3-4~~ claim 3, wherein material of the spacer is as the same as material of the micro-lens.

~~6.~~5. The light emitting pixel unit according to ~~any one of claims 1-5~~ claim 1, wherein the micro-lens is composed of a dielectric material.

~~7. The light emitting pixel unit according to claim 6, wherein the dielectric material comprises silicon oxide.~~

~~8.~~6. The light emitting pixel unit according to ~~any one of claims 1-7~~ claim 1, wherein material of the micro-lens is photoresist.

~~9.~~ The light emitting pixel unit according to ~~any one of claims 1-8~~ claim 1, wherein the height of the micro-lens is not more than 2 micrometers~~.~~

~~10.~~7. ~~The light emitting pixel unit according to any one of claims 1-9, wherein~~ , and the width of the micro-lens is not more than 4 micrometers.

~~11.~~8. The light emitting pixel unit according to ~~any one of claims 1-10~~ claim 1, wherein, on the substrate, the at least one mesa is within a matrix of mesa array, and the micro-lens is within a matrix of micro-lens array placed according to placement the mesa array.

~~12.~~9. The light emitting pixel unit according to ~~any one of claims 1-11~~ claim 1, wherein the top of the at least one mesa is flat, and the shape of the micro-lens is hemisphere.

~~13.~~10. The light emitting pixel unit according to ~~any one of claims 1-12~~ claim 1, wherein the at least one mesa includes at least a light emitting device.

~~14. The light emitting pixel unit according to claim 13, wherein the light emitting device includes a PN junction.~~

~~15.~~11. A method of fabricating a light emitting pixel unit, comprising:

providing a substrate;

forming at least one mesa on the substrate; and

depositing a micro-lens material layer directly on at least a top of the at least one mesa, wherein the micro-lens material layer is conformed to a shape of the at least one mesa and has a shape of hemisphere on the at least one mesa.

~~16.~~12. The method of fabricating a light emitting pixel unit according to claim ~~15~~11, wherein the micro-lens material layer is deposited by a chemical vapor deposition technology.

~~17. The method of fabricating a light emitting pixel unit according to claim 16, wherein, parameters of the chemical vapor deposition technology used to deposit the micro-lens material layer include: power is 0 W to 1000 W, pressure is 100 milli-torr to 2000 milli-torr, temperature is 23 °C to 500 °C, gas flow rate is 0 sccm to 3000 sccm, and time is 1 hour to 3 hours.~~

~~18. The method of fabricating a light emitting pixel unit according to any one of claims 15-17, wherein the micro-lens material layer is composed of a dielectric material.~~

~~19.~~13. ~~-~~The method of fabricating a light emitting pixel unit according to ~~any one of claims 15-18~~ claim 12, further comprising: patterning the micro-lens material layer to expose an electrode area of the substrate.

~~20.~~14. The method of fabricating a light emitting pixel unit according to claim ~~19~~13, wherein patterning further includes:

forming a mask on surface of the micro-lens material;

patterning the mask via a photolithography process, thereby forming openings in the mask and exposing the micro-lens material layer above the electrode area of the at least one mesa; and

with the mask protection in place, etching portions of the micro-lens material layer exposed by the openings.

~~21.~~15. The method of fabricating a light emitting pixel unit according to claim ~~20~~14, wherein etching is a wet etching method.

~~22.~~16. A method of fabricating a light emitting pixel unit, comprising:

providing a substrate;

forming at least one mesa on the substrate;

depositing a micro-lens material layer directly on at least a top of the at least one mesa, wherein the micro-lens material layer covers the top of the at least one mesa and top surface of the micro-lens material is flat; and

patterning the micro-lens material layer from top down, thereby forming at least a hemisphere in the micro-lens material layer, without passing through the micro-lens material layer, wherein the hemisphere is placed above the at least one mesa.

17. The method of fabricating a light emitting pixel unit according to claim 16, further comprising: after forming the at least one mesa and before depositing the micro-lens material layer, forming a mark layer with marks for aligning to the micro-lens material layer in the patterning process.

~~23.~~18. The method of fabricating a light emitting pixel unit according to claim ~~22~~17, further including:

depositing a mask layer on the surface of the micro-lens material layer;

patterning the mask layer to form a hemisphere pattern in the mask layer; and

using the hemisphere pattern as a mask, etching the micro-lens material layer to form the hemisphere in the micro-lens material layer.

~~24.~~19. The method of fabricating a light emitting pixel unit according to claim ~~23~~18, wherein, after the micro-lens material layer is etched, the micro-lens material layer is not etched through to expose top surface of the at least one mesa, thereby a spacer is formed on the top of the at least one mesa.

~~25. The method of fabricating a light emitting pixel unit according to any one of claims 22-24, wherein the micro-lens material layer is deposited by spin coating.~~

~~26.~~20. The method of fabricating a light emitting pixel unit according to ~~any one of claims 23-25~~ claim 18, wherein the mask layer is patterned by a photolithography process firstly and then a reflowing process.

~~27. The method of fabricating a light emitting pixel unit according to any one of claims 23-26, wherein etching the micro-lens material layer is by a photolithography process.~~

~~28. The method of fabricating a light emitting pixel unit according to any one of claims 22-27, further comprising: after forming the at least one mesa and before depositing the micro-lens material layer, forming a mark layer with marks for aligning to the micro-lens material layer in the patterning process.~~

~~29. The method of fabricating a light emitting pixel unit according to any one of claims 22-28, further comprising: after patterning the micro-lens material layer, patterning the micro-lens material layer to expose an electrode area of the substrate.~~