Using of Microled Lighting on Mountain Trails

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***Abstract*- Micro light-emitting diode (microLED) technology is expected to be used in next-generation displays and other applications due to its many advantages. Most of the roads and highways are connected with many mountains and transportation is most important during these days so we can use MICROLED displays on crossings which can glow in low temperature and it consumes low power. As we know that mountain doesn't have proper electricity, so we can use it on mountain trails which can make easy transportation and accident free roadways. The micro LED technology looks like it will have a very big impact to the market for many different applications, so it's really satisfying."Imagine a computer shrinks to a pen that can project the images." Micro LED displays and lights last longer and can operate in temperatures between minus 150 degrees to 250 degrees Fahrenheit.**

They also are more shock resistant and produce light more efficiently and so use less energy than current LED lights and display technologies. This technology can also be used for image projection. You can display all the information on a wall, on a window, on a car windshield and on road side traffic signs.

Key words: LED, LCD, OLEDs

1. INTRODUCTION

MicroLED also known as micro-LED, mLED or **µ**LED, is an emerging flat-panel display technology. microLED displays consist of arrays of microscopic LEDs forming the individual pixel elements. When compared with widespread LCD technology, microLED displays offer better contrast, response times, and energy efficiency. Along with OLEDs, microLEDs are primarily aimed at small, low-energy devices such as AR glasses, VR headsets, smart watches and smart phones. OLED and microLED both offer greatly reduced energy requirements when compared to conventional LCD systems while also offering an infinite contrast ratio.

Inorganic semiconductor microLED (µLED) technology was first invented in 2000 by the research group of Hongxing Jiang and Jingyu Lin of Texas Tech University while they were at Kansas State University. Following their first report of electrical injection microLEDs based on indium gallium nitride (InGaN) semiconductors, several groups have quickly engaged in pursuing this concept Many related potential applications have been identified. Various on-chip connection schemes of microLED pixel arrays have been employed allowing for the development of singlechip high voltage DC/AC-LEDs to address the compatibility issue between the high voltage electrical infrastructure and low voltage operation nature of LEDs and high brightness self-emissive microdisplays.

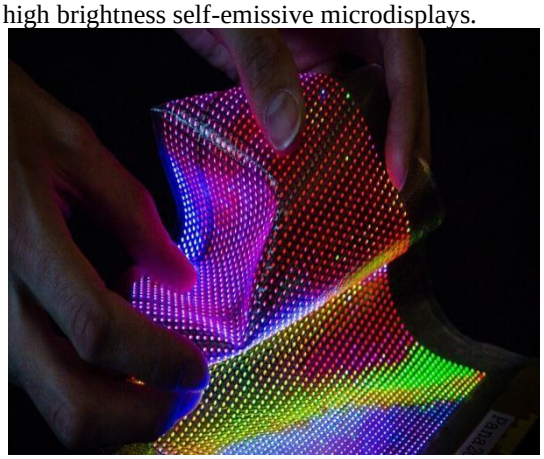

Fig1:MICROLEDs

The microLED array has also been explored as a light source for optogenetics applications and for visible light communications.

2.EASE OF USE

We can use MICROLEDS on mountain trails ,we can run microleds with low power and microleds will glow with high quality lighting .which is more brighter and high definition..At the tiem of crossing we can built a sign board with microleds ,we can use it as fog lights ,microled displays will also attract tourism by displaying touring spots ,which can also increase economy of a contry and finally no accidents will occur due to roads which covered with fog .we can make transport easily .already our automotive companies ar going to make vehicle lights with microleds so as same as if we make microledboards,microledlights,microled displays on mountain trails which will make transportation esay ,goods vehicles will move during foggy weather and in winter climate,which will make accident free country

Fig2:LED stret lights we have to replace it with microled

Several industry analysts and technology enthusiasts believe that microLED would become a next-generation technology that could compete head-on against or totally replace IPS LCD and OLED display technologies.
But what exactly is microLED? For starters, it involves using microscopic light-emitting diodes or LEDs and fitting them into a single pixel. Earlier prototypes have demonstrated three microscopic LEDs per pixel. The fact that display panel uses LEDs means that it does not require LED backlighting unlike LCD technologies. LEDs are self-emissive.

Nevertheless, one of the primary selling points and thus, advantages of this technology is that it has the positive characteristics of OLED minus the drawbacks associated with shorter lifespan due to screen burn-in and limited luminosity.

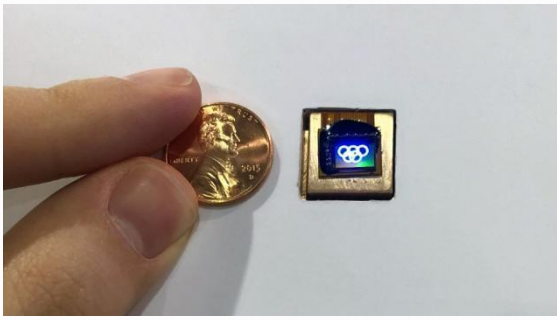

Fig3:Microled penny display

3.ADVANTAGES

- It offers higher luminous efficiency and higher brightness and shorter response time due to use of inorganic materials.
- It is highly reliable and offers higher contrast.
- Due to its self illuminating characteristics it works without backlight. Hence it is smaller in size and lighter in weight. Moreover it is thinner and consume less power.
- It offers wide viewing angles which provide greater comfort to the viewers.
- It offers longer lifetime and it is environmentally stable.
- It offers faster refresh rates i.e. short response time (usually in nanoseconds) .
- It can be constructed using curved/flexible backplanes.
- It offers high resolution/pixel density.

4.MANUFACTURING

In comparison with conventional LED, the demands for Micro LED is more complicated and sophisticated since Micro LED chip size is only 1% of LED, which is less than 100 um. The extreme size of the components marked a new generation technology and also brought about numerous new challenges. Here, we would like to analyze the process of Micro LED display production and point out the barriers of different steps.

Same as LED, epitaxy wafer plays a fundamental role in Micro LED chips. However, the requirement of Micro LED epitaxy is much higher than conventional LED. Given that chip size of Micro LED is no bigger than 100 um, the wavelength uniformity of epitaxy become even more critical as wafer unevenness could lead to defect of LED chips. However, currently most of the existing equipment was designed for conventional LED wafers production and can hardly meet the demands for Micro LED wafers.

Chip process on epitaxy wafer is also crucial as it would affect further production process including bonding and transferring. In order to meet the requirements of different transferring methods, chip makers would have to work closely with transfer technology providers for improve overall yield and efficiency.

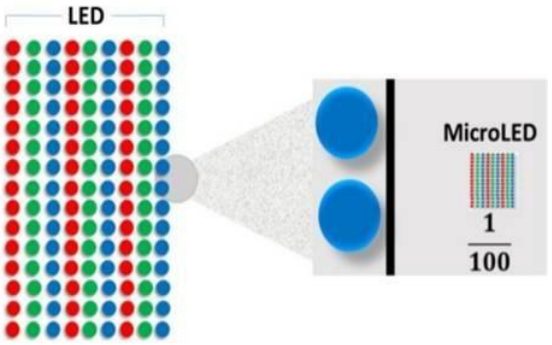

Fig4: Microled chip is only 1%of LED

To turn LED chips into a high performance display, Micro LED chips first need to be removed from sapphire substrate to a temporary substrate then from the temporary substrate to different backplanes depending on function and purpose required. Since the numbers of chips are massive and the size is incredibly small, the transferring process is very challenging. Conventional pick and place process will take too much time transferring millions of LEDs, boosting manufacture cost. Other transferring technologies are also in development to speed up the process. Moreover, bonding and assembling chips accurately on targeted receiving substrates without damaging the chips is a key challenge as well.

5.CONCLUSION

MicroLED may even achieve a naked-eye threedimensional display, which may be the thirdgeneration display after the next-generation microLED displays we are discussing. . Full parallax displays were considered impractical because displays required a large amount of data bandwidth and the complicated hardware with the existing display technologies. MicroLED with features of small pixel pitch, self-emission, high brightness, and high efficiency makes a small and compact light field display system possible .
We can conclude that this can also be use on mountain trails for easy transportation and to make the accident free

mountain ways by replacing other lights with micoled lights and sign boards ithmicroled screen boards.
The comparison between microLED, liquid crystal display, and organic light-emitting diode displays, as well as the various applications of microLEDs, are reviewed

REFERENCES

[1] Topical Review MicroLED technologies and applications: characteristics, fabrication, progress, and challenges Article in Journal of Physics D Applied Physics · January 2021
[2] Microled info.com Microled experts
[3] "Microleds:the next revolution in displays,jan 29 2019
[4] US7535028B2 MicroLED based high voltage ac dc indicator lamp-Espacenet
[5] Micro led Displays: challenges and opportunities wed,29 april ,2020 - compoundsemiconductor.net
[6] Electronic Devices and circuits –jacobmilliman and Christos c