

Amoled-Today's Technology

Nikita Sunil Morey

Ruchika Vikas Ninghot

Shital Mangalrao Pachare

Abstract—There are various inventions in technologies for the mobile and television display. One of the recent display technologies is Active Matrix Organic Light Emitting diode. AMOLED technology is mostly is used in smart watches, mobile, laptops and televisions. AMOLED uses thin film type displays that are coated with certain electroluminescent material. Basically this technology deals with the quality of pixels of the display. When properly electrically activated, the Active Matrix OLED in AMOLED technology produces a light. The requirement of continues flow of electricity is controlled by two TFTs. This technology consumes less power. In near future this technology will be widely use in portable devices and large screens.

I.INTRODUCTION

OLED uses a specific thin film display technology in which organic material such as electroluminescent material is used. Basically this technology deals with the quality of pixel of the display. It is an advancement of OLED technology hence its characteristic is somewhat similar to OLED. Basically it is a simple light emitting diode whose luminance is provided by a film made up of organic compound. OLEDs come in either active or passive format. The passive format gives for low cost display but it has poor resolution and its poor consumption is high. On the other hand AMOLED have longer lifetime and required current flow is small. AMOLED needs a stable and programmable current source at each pixel since it is a current driven device.



Fig. 1: Picture of amoled display and normal display

II.CONSTRUCTION

It consists of emissive layer, conductive layer, a substrate and both anode cathode terminal. Emissive layer, where the light is made by emitting radiation whose frequency is in the visible region and is made up of organic plastic molecule which transfers electrons from the cathode the polymer used is polyfluorene .The conductive layer is made up of organic plastic that transfers whole from anode and conducting polymer used is polyaniline. The substrate is made up of flexible plastic, inexpensive glass or metal foil. Anode is generally made up of Indium tin oxide and it is transparent. Cathode is made up of aluminum and calcium that may or may not be transparent.

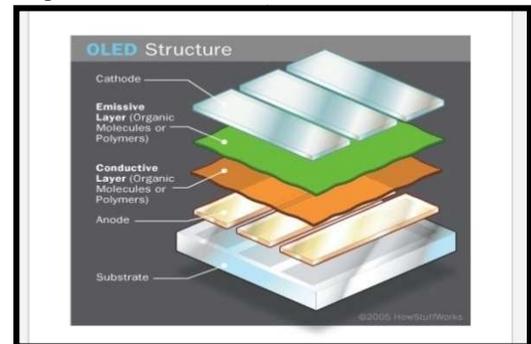


Fig. 2: Construction of amoled

III.WORKING

The amoled has a considerably greater degree of flexibility and control when compared to passive relation. Active matrix organic light emitting diode (AMOLED) consist of a matrix of OLED pixels, each having anode and cathode and a layer of organic material in between them. These pixels are activated by a thin layer of transistor array which controls the current to each pixel. It causes OLED to be activated and when current flows through these pixels light is generated.

Two transistors are used in one pixel, one transistor to turn the charge to the pixel on and off and the second one to provide constant current. This eliminate the need for very high currents required for passive matrix OLED.

TFT backplane technology is an essential element for AMOLED display fabrication. Two primary TFT backplane technologies, polycrystalline silicon and amorphous silicon are used today in AMOLED. This technology offers a potential for fabricating the active matrix backplane at low temperatures directly on to flexible plastic substrate for producing flexible AMOLED display. The TFT array uses a very small amount of energy unlike an LCD. It is able to refresh very fast. This means that it is very to television and other display where moving graphic are to be seen.

IV.APPLICATIONS

1.The AMOLED are basically used in touch screens of mobile phones, atthe same time it is used in computers, net books, tablets, etc.

2.AMOLED also used in smart watches, medical and automotive gaming era.

3.It is also used cathode ray tube.

4.Night vision goggle displays are certainly one of the best applications of AMOLED. The better the quality and contrast the easier it is for soldier to see what is coming at them.

5.Reducing the weight a soldier carries is essential for military and AMOLED displays are both thin and use low power. 80% less than LCD displays. Thus, reducing the battery power required.

6. AMOLED technology also offers commercial applications where the company has made inroads in such areas as binoculars, high end cameras, fire fighting thermal goggles and gaming equipment.

7. Our displays are mobiles and are built for applications where flat panels don't make sense such as veterinarian headset for farm animals.



Fig.3: Stretchable amoled display

V.ADVANTAGES

1.AMOLED are thinner, lighter and more flexible than the LCD or led displays.

2. Plastic, organic layer of an oled are 100-500 nanometers thick or about 200 times smaller than human hairs

3. They are brighter than leds because organic layer of amoled are much thinner than the led .also they donot require glass for support which absorb sunlight

4. It has ability to emit light from a surface, low heat generation and the environmentally sound compared to fluorescent lamp

5. They do not require backlighting like LCDS as they generate light themselves, so they consume less power than LCD.

6. They are easier to produce and can be make to large sizes because they are essentially plastics, which can be made into large, thin sheets.

7.They can give a greater artificial contrast ratio that is measured in purely dark condition and have better viewing angle as compare to LCD.

8. They have faster time response than LCD screens.

9. AMOLED is the most eco-friendly display structure requiring a low amount of energy consumptions.

VI.DISADVANTAGES

1. Limited lifetime of organic material while red and green films OLED has larger life span, blue have small lifetime.

2. The intrusion of water into display can damage the organic material

3. The manufacturing of the substrate is complex and expensive process in the production of TFT LCDS, so flexible substrate such as roll-up displays and displays embedded in fabric or clothing can be use.

4. It can be easily damage by water.

5.AMOLED have much more expensive manufacturing process.

VII.FUTURE SCOPE

Combining transparent amoled display panel with the solar panel at the back. As we know, this transparent oled panels are made out of all transparent materials, so they transmit high amount of light through them a high efficiency (40% and more) solar panel placed at the back can help increase the battery life of phones so they can charge fast, but last long .some calibration can be needed to achieve color accuracy like that of normal amoled display. The cost of very high efficiency solar

panels may be very high but it should be very less for sizes as small as smart phones display.

VIII. REFERENCES

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