AMOLED

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Content

Introduction

- Active-Matrix OLED (Active-matrix organic light-emitting diode or AMOLED) is a display technology
- AMOLED is the type of OLED.
- OLED describes specific type of thin display technology and Active Matrix refers to the technology behind the addressing of pixels.

What is AMOLED?

- AMOLED is a display technology used in some of the most popular mobile devices available today, including various android handsets and tablets.
- AMOLED is a new display technology that is rapidly becoming viable for many applications.
- AMOLED is a self light emitting technology composed of a thin, multi-layered organic film placed between an anode and cathod.
- In contrast to LCD/TFT technology,AMOLED does not require a backlight.

HISTORY

1. The first EL from an organic molecule was reported by pope and coworkers in 1963.
2. The active matrix technology is invented by Bernard Lechner in 1975.

AMOLED COMPONENT

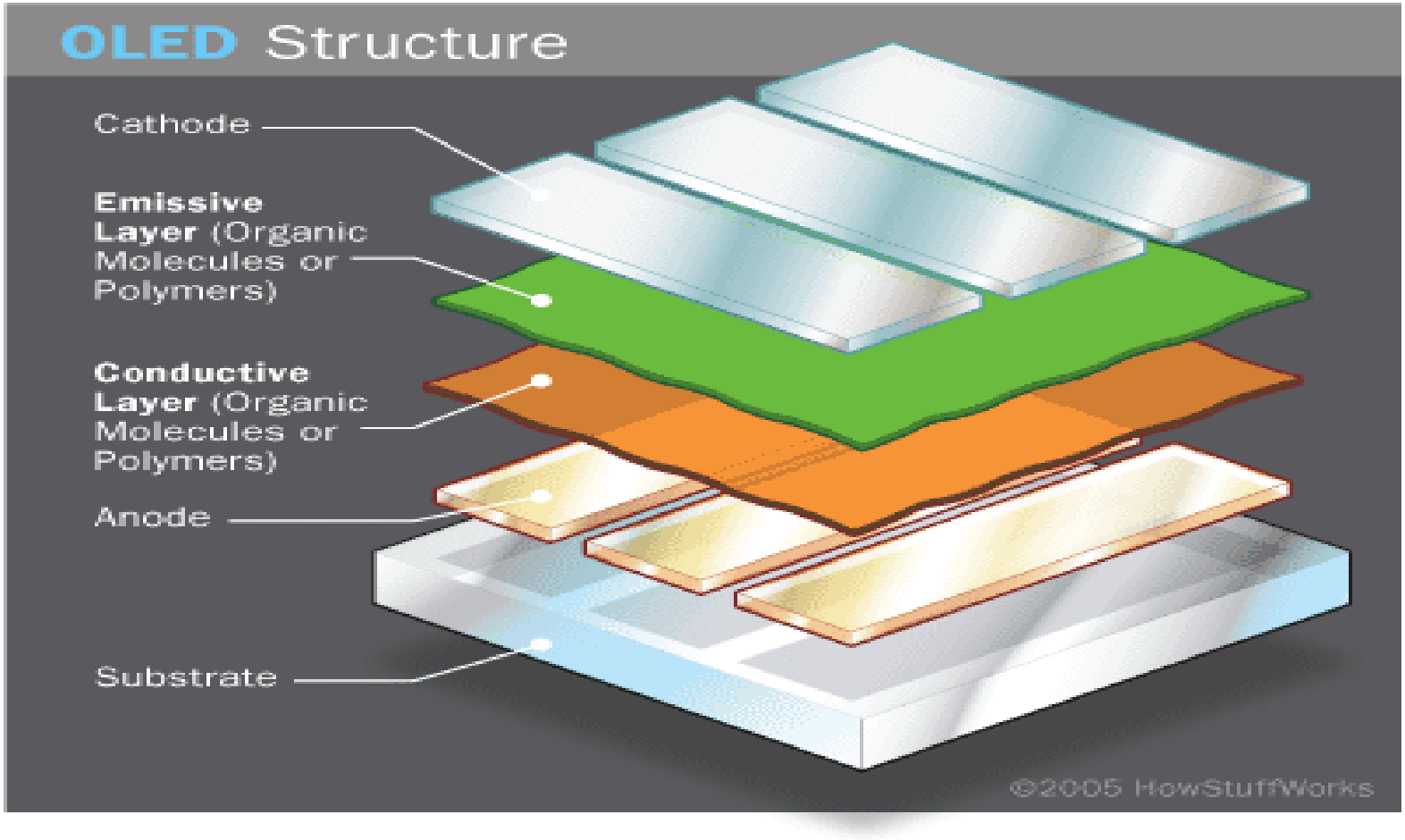
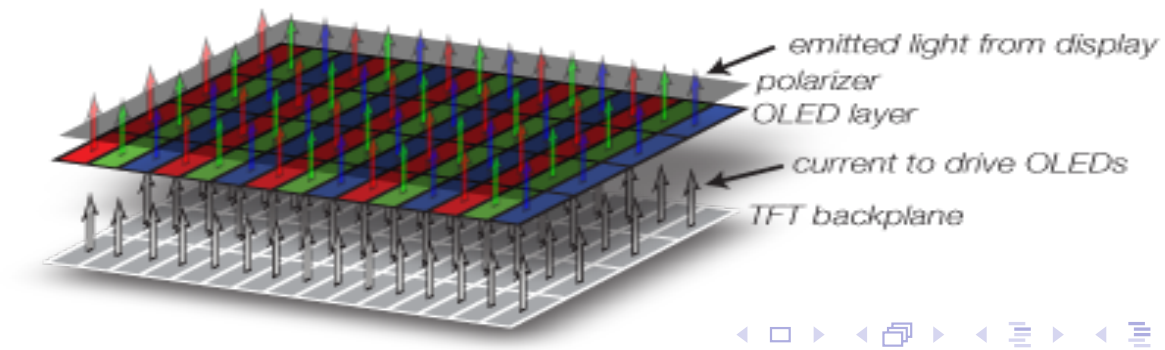


Figure: OLED structure

Working

- The AMOLED display consist of a matrix of OLED pixels, each having an anode, cathod and a layer of organic material between them.
- These pixels are activated by a thin film transistor which control each current pixel.
- Typically two transistors are used for each pixel-one to turn the change to the pixel on and off,and second provide constant current.



Comparison:

AMOLED	LCD	PLASMA
• Potentially the lowest cost. • Consumes lowest power	• Medium cost. • Lower Power consumption than plasma	• Highest cost • Highest power consumption
• Self emissive. • Displays wider color range.	• Requires backlight. • Color range not good.	• Requires backlight. • Displays a very deep black.
• No screen burn potential • Shorter overall lifetime	• No screen burn potential • Backlight bulb typically requires replace at around 30 k hours	• Screen burn potential • Half life ~60k hours

Manufacturing of AMOLED

- The biggest part of manufacturing AMOLED is applying the organic layers to the substrate. This can be done in three ways:
- Vaccum Deposition or Vaccum thermal evaporation(VTE)
- Organic Vapor Phase Deposition(OVPD).
- Inkjet Printing

Manufacturing of AMOLED

- High brightness is achieved at low drive voltages/current densities.
- Self luminescent so no requirement of backlighting.
- Materials do not need to be crystalline, so easy to fabricate.
- High contrast

APPLICATIONS

- Higher contrast radio and sun readability.
- Thinner and Flexible
- Lighter weight
- Large viewing angle
- Brightness
- Less power consumption
- Faster response

Advantages

- Thinner, lighter and more flexible.
- plastic substrates rather than glass.
- Do not require backlight, auto generated.
- low voltage, low power
- Brighter-good daylight visibility.
- High resolution.

Disadvantages

- Low Lifetime
- Efficiency of Blue OLED.
- Susceptible of Water.

CONCLUSION

- Limited use caused by degradation of materials.
- AMOLED will replace current LED and LCD technologies.
- Flexibility and thinness will enable many applications.

References

- "Introduction to OLED Displays Design Guide for Active Matrix OLED (AMOLED) Displays"
- http://www.digitaltrends.com/mobile/amoled-vs-lcd-which-screen-is-best-for-your-phone/
- "Super AMOLED Advanced.". Retrieved March 24, 2014.
- Suyko, Alan. "Oleds Ready For The Mainstream." Electronics News (2009): 20. Associates Programs Source Plus. Web. 9 Dec. 2011.
- Reid Chesterfield, Andrew Johnson, Charlie Lang, Matthew Stainer, and Jonathan Ziebarth, "Solution-Coating Technology for AMOLED Displays", Information Display Magazine, January 2011.


Thank you