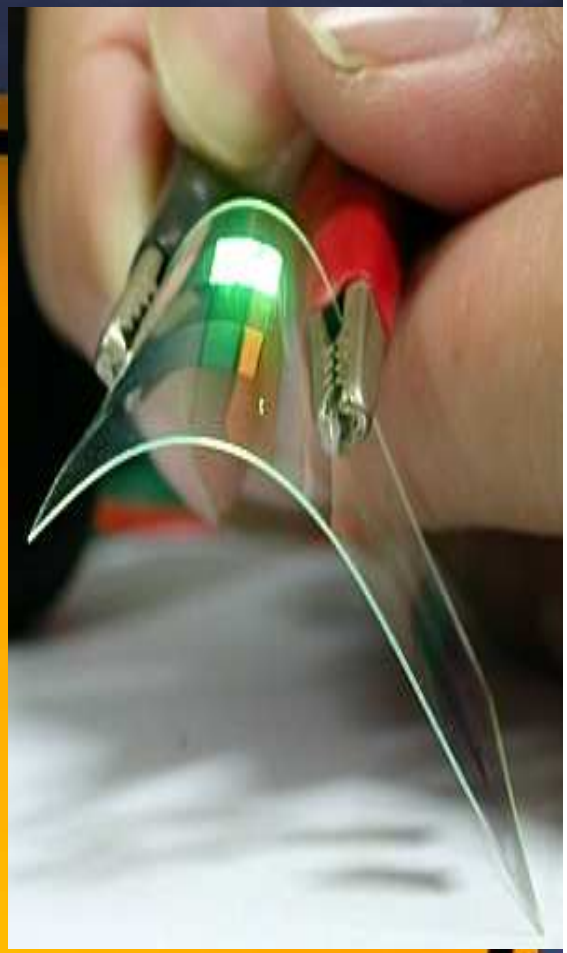
Organic Light Emitting Diode

WHAT IS OLED??

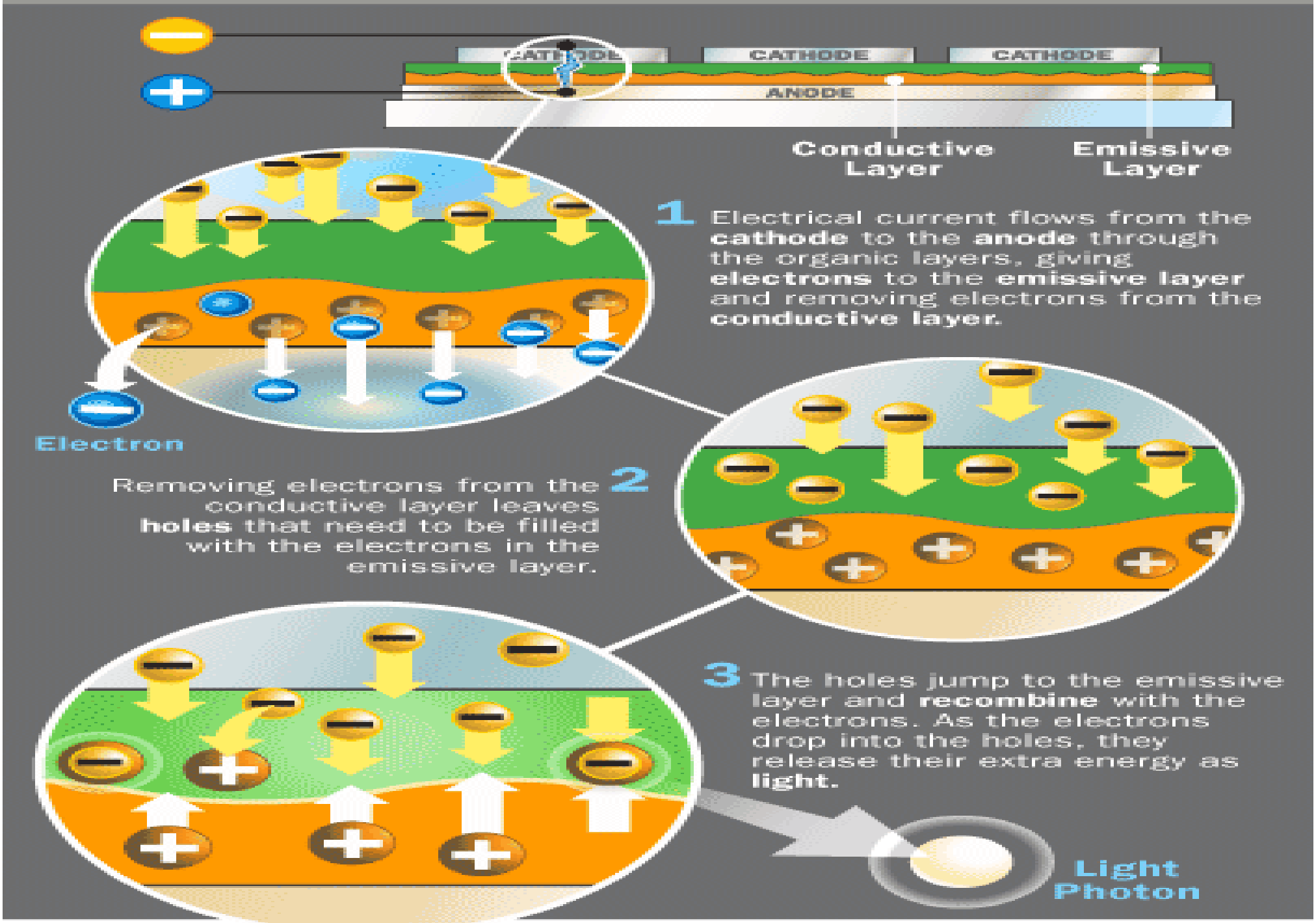
OLED stands for Organic Light Emitting Diode. The "organic" in OLED refers to organic material. Carbon is the basis of all organic matter. Examples of carbon-based substances include sugar, wood and the majority of plastics. The "LED" stands for "Light Emitting Diode" and describes the process of converting electric energy into light.



HOW DOES OLED WORK??

A Layer of organic material is sandwiched between two conductors (an anode and a cathode), which in turn are sandwiched between a glass top plate (seal) and a glass bottom plate (substrate). When electric Current is applied to the two conductors, a bright, electro-luminescent light is produced directly from the organic material.

OLED Creating Light



HOW IS COLOR CREATED??

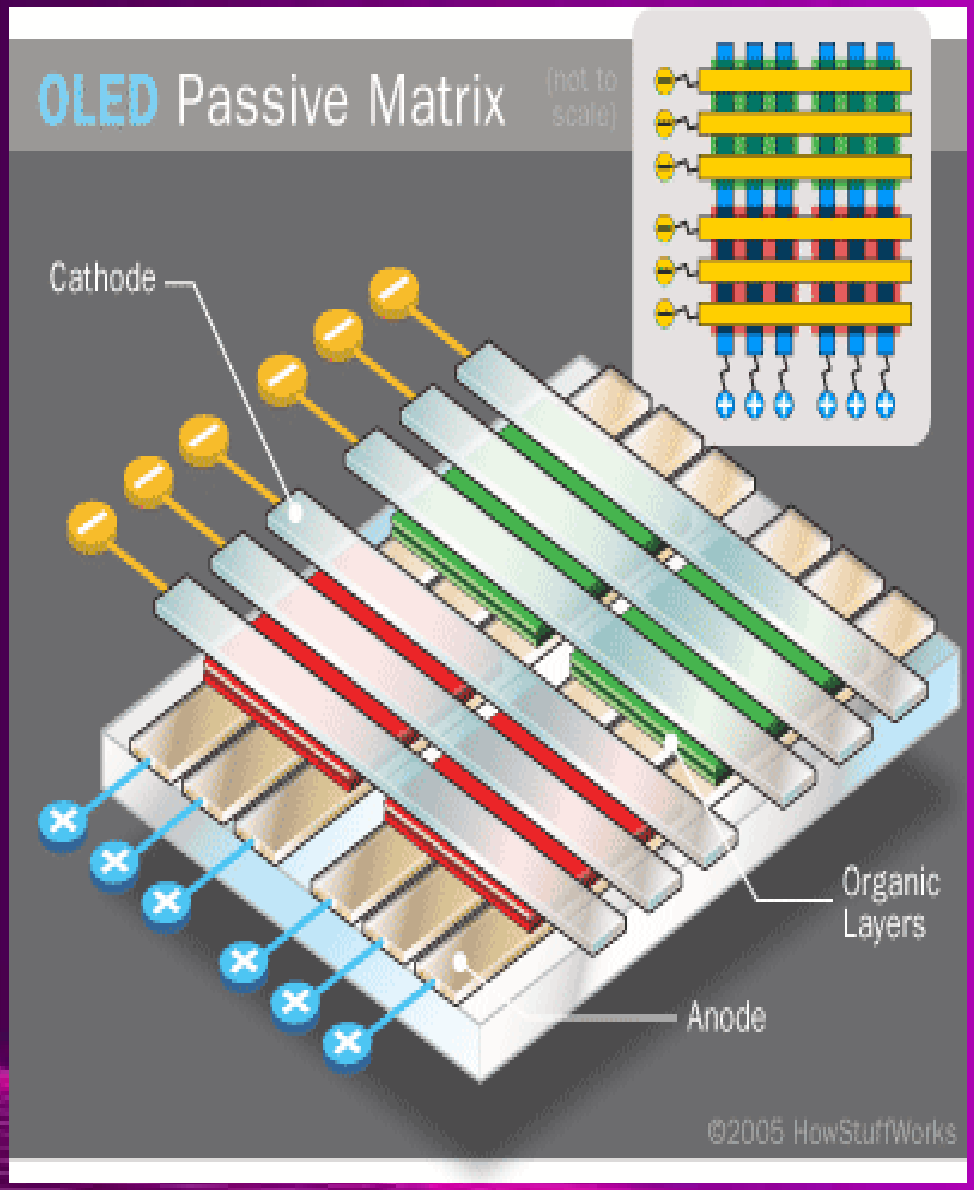
The thickness of the organic Layer is adjusted to produce the strongest light for each of the colors red, green and blue - used to render the color picture. The three colors are further refined by a color filter,
which purifies each color without the need for a polarizer, rendering outstanding color purity.

Types of OLEDs

- Passive-matrix OLED
- Transparent OLED
- Active-matrix OLED
- Top-emitting OLED
- Foldable OLED
- White OLED

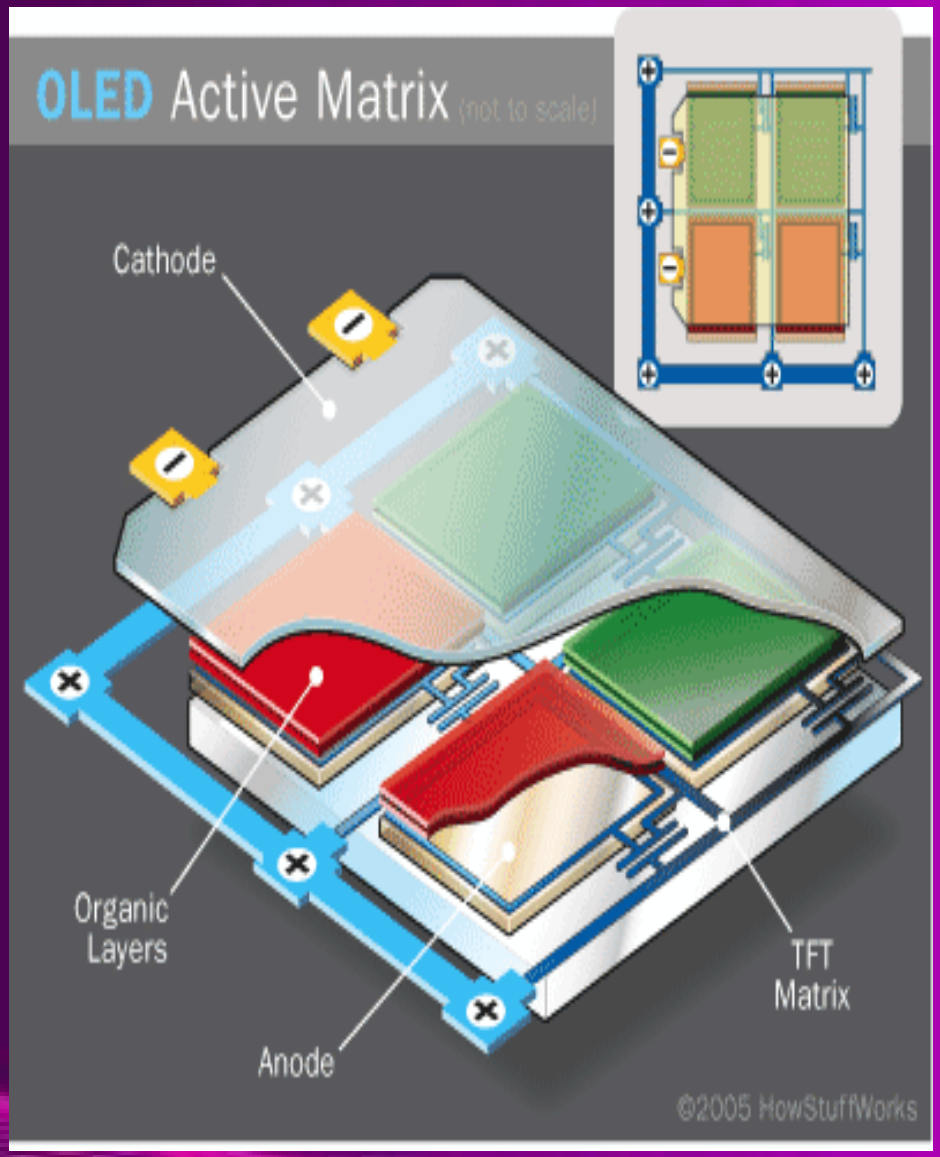
Passive-matrix OLED

They are made up of a matrix of electrically conducting row and columns making pixels. Between these rows and columns are the organic layers and on the other side is the substrate. They are most efficient for smaller screens (2-3") such as PDAs and cell phones.



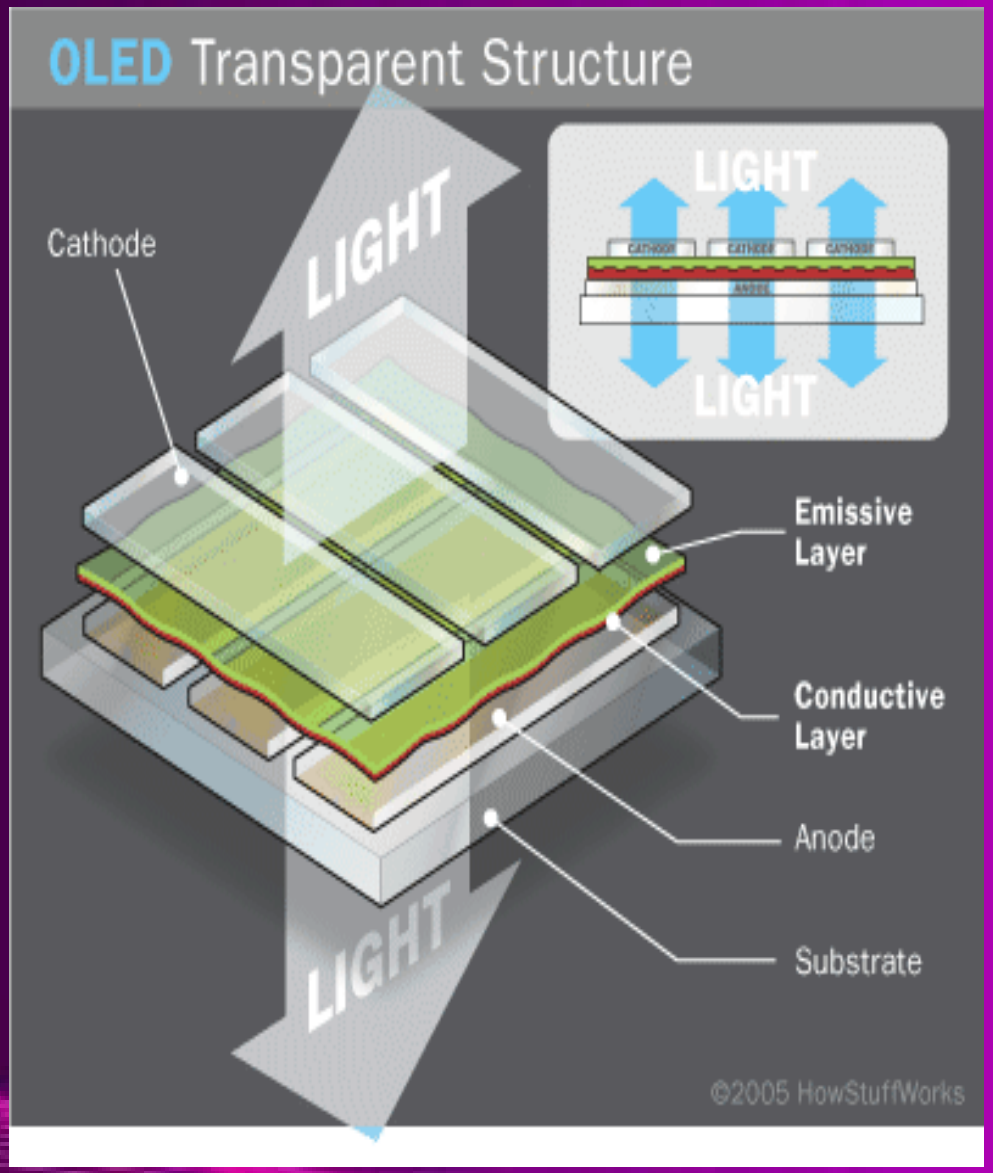
Active-matrix OLED

In AMOLED there will be two TFT arrays per pixel, one starts and stops the charge and the other keeps a constant electrical current to the pixel. Since there is a TFT array there they will consume less power then the PMOLED since there is that constant current and they have faster refresh rates then the PMOLED.



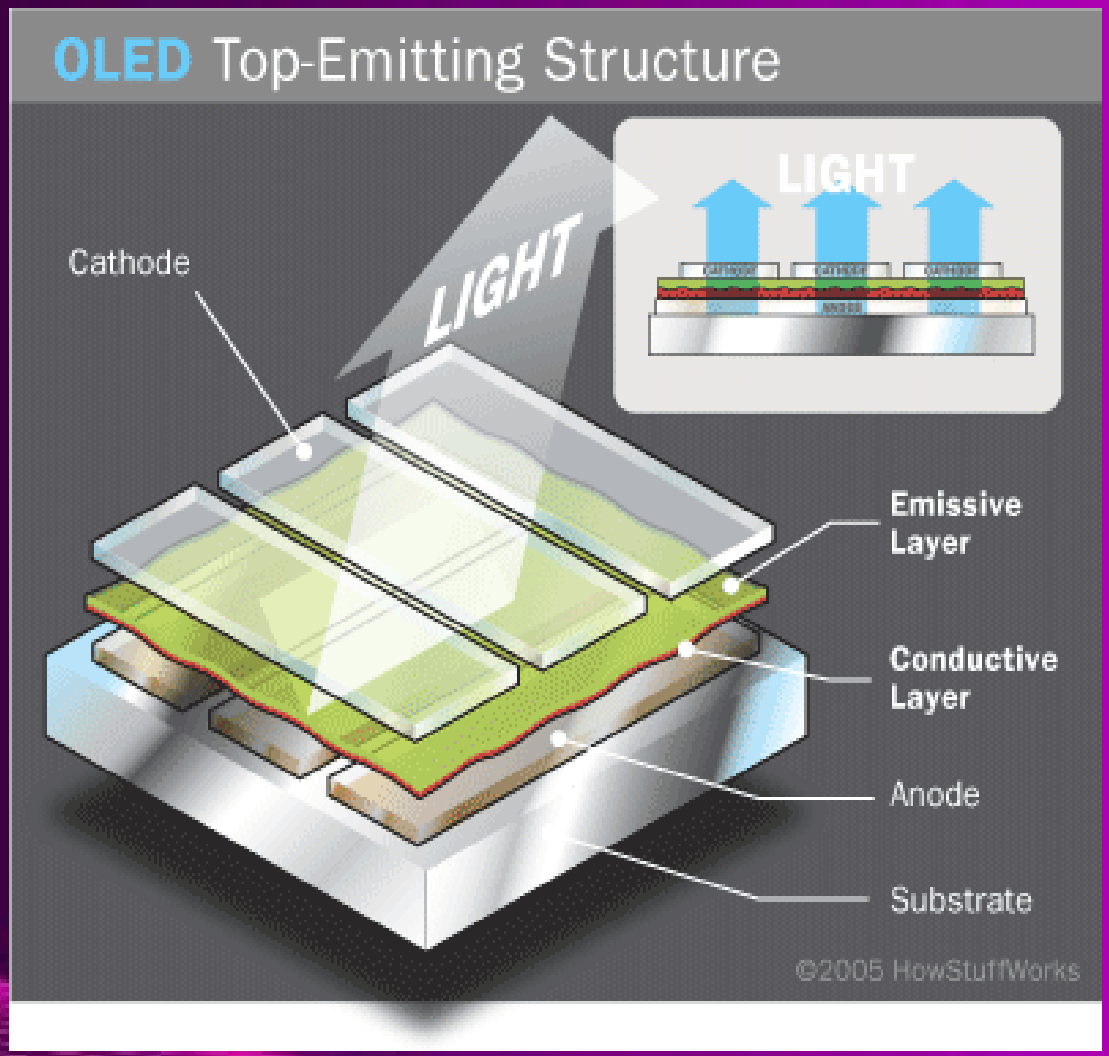
Transparent OLED

This type of OLED have transparent components that allows light to pass through both sides. Transparent OLED displays can either be of passive matrix or active matrix.
This technology can be used for heads-up displays.



Top-emitting OLED

This type of OLED has a substrate that can either be opaque or reflective. This OLED is best suited for active matrix designed OLED's.



Foldable OLED

This is a type of OLED that has a substrate made out of flexible metallic foils or plastic. The flexibility allows this OLED to be used in a wide variety of innovative ways. They can be attached to fabrics and is currently been used in display screens for cell phones and PDA's. Their flexibility helps reduce screen breakage, a major problem for such gadgets. Potentially, foldable OLED displays can be sewn into fabrics for "smart" clothing, such as outdoor survival clothing with an integrated computer chip, cell phone, GPS receiver and OLED display sewn into it.

White OLED

A white organic LED (OLED) incorporating a blue phosphorescent dye and a down-conversion phosphor has achieved a luminous efficancy of 25 lm/W. This high-efficacy device was enabled by lowering the device operating voltage, increasing the outcoupling efficiency, and incorporating highly efficient phosphorescent emitters.

OLED Advantages

- Because the light-emitting layers of an OLED are lighter, the substrate of an OLED can be **flexible** instead of rigid. OLED substrates can be plastic rather than the glass used for LEDs and LCDs.
- The plastic, organic layers of an OLED are **thinner, lighter and more flexible** than the crystalline layers in an LED or LCD.
- OLEDs are **brighter** than LEDs. Because the organic layers of an OLED are much thinner than the corresponding inorganic crystal layers of an LED, the conductive and emissive layers of an OLED can be multi-layered. Also, LEDs and LCDs require glass for support, and glass absorbs some light. OLEDs do not require glass.

•OLEDs do not require backlighting like LCDs. LCDs work by selectively blocking areas of the backlight to make the images that you see, while OLEDs generate light themselves. Because OLEDs do not require backlighting, they **consume much less power** than LCDs (most of the LCD power goes to the backlighting). This is especially important for battery-operated devices such as cell phones.

•OLEDs are easier to produce and can be made to larger sizes. Because OLEDs are essentially plastics, they can be made into large, thin sheets. It is much more difficult to grow and lay down so many liquid crystals.

•OLEDs have **large fields of view**, about 170 degrees. Because LCDs work by blocking light, they have an inherent viewing obstacle from certain angles. OLEDs produce their own light, so they have a much wider viewing range.

Disadvantages

OLED seems to be the perfect technology for all types of displays, but it also has some problems:

- **Lifetime** - While red and green OLED films have longer lifetimes (46,000 to 230,000 hours), blue organics currently have much shorter lifetimes (up to around 14,000 hours).
- **Manufacturing** - Manufacturing processes are expensive right now.
- **Water** - Water can easily damage OLEDs.

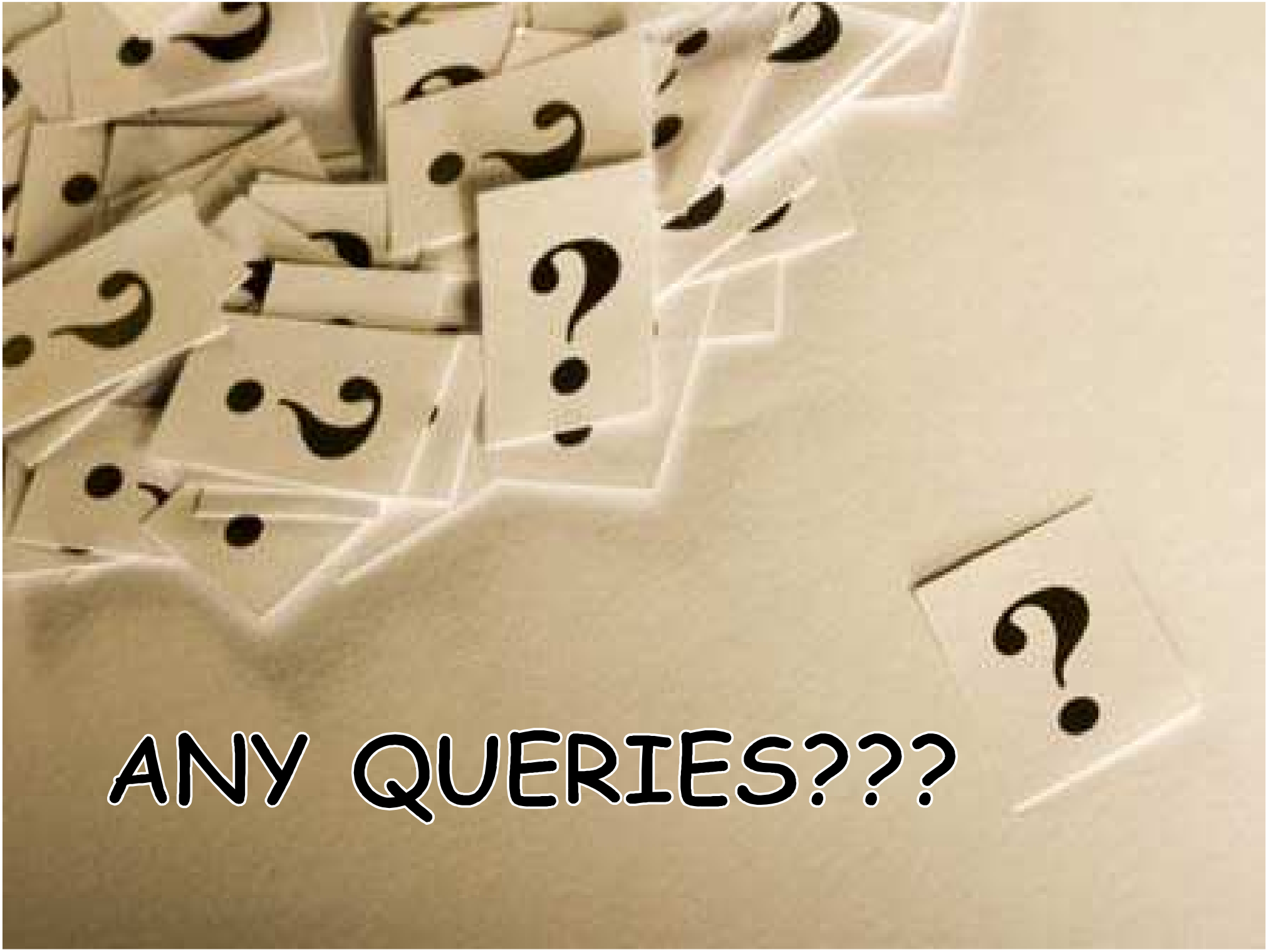
Comparison table

CRTs	LCDs	OLED
highest costing	higher costing	lowest costing
more colors displayed then LCDs	fewest colors displayed out of the three	more colors displayed then LCDs
self-emissive	use a back light	self-emissive
		brighter then LCDs, high luminance
can be viewed at any angle	have a inherent viewing obstacle at certain angles	much wider viewing angle (about 170 degrees)
Uses more power		use less than half the power of LCDs
	involves layering to be created	involves layering to be created


www.oled-display.net


CONTACTS
MESSAGES
SETTINGS
MUSIC
17:34


NOKIA
connecting people


ANY QUERIES???