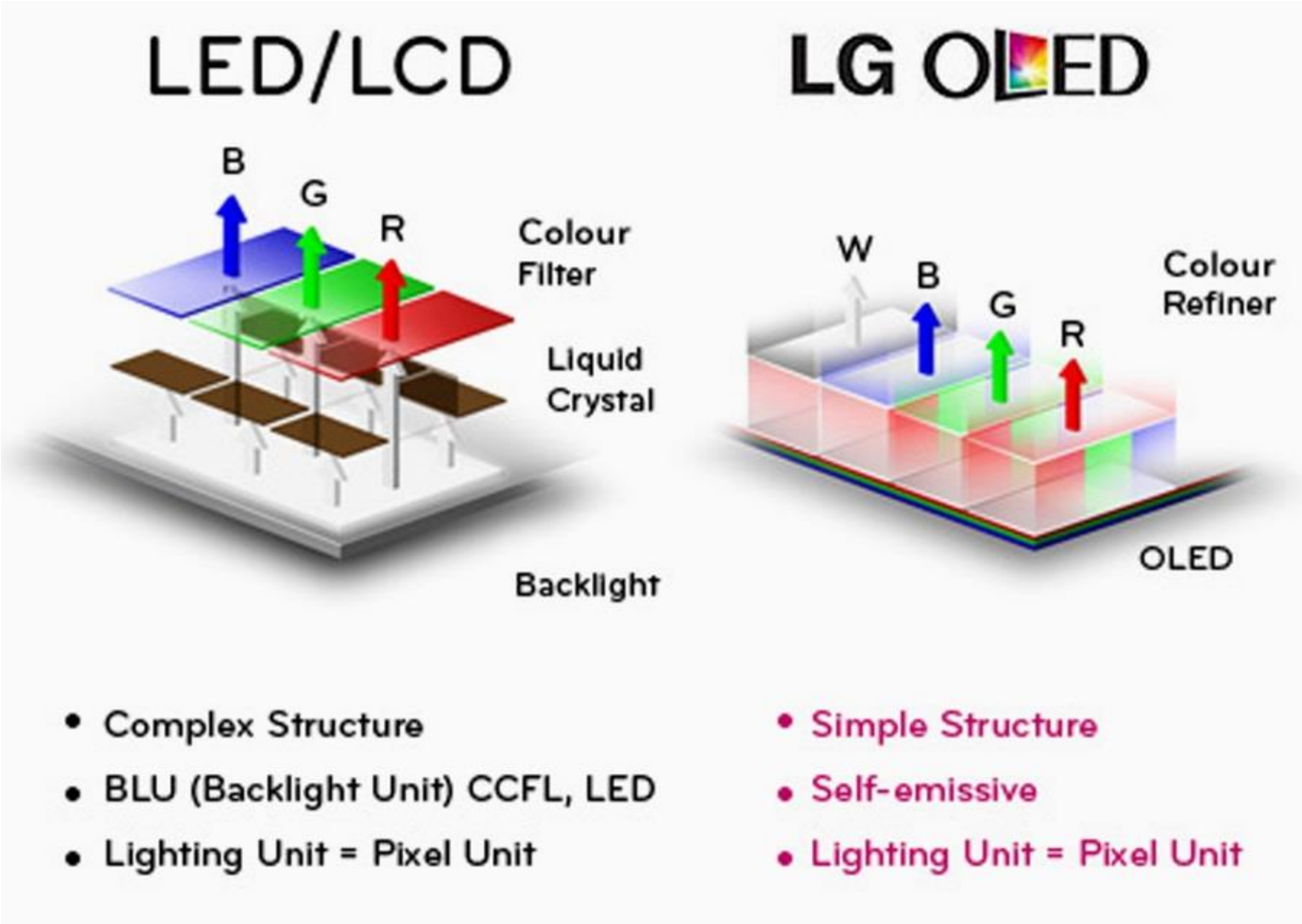
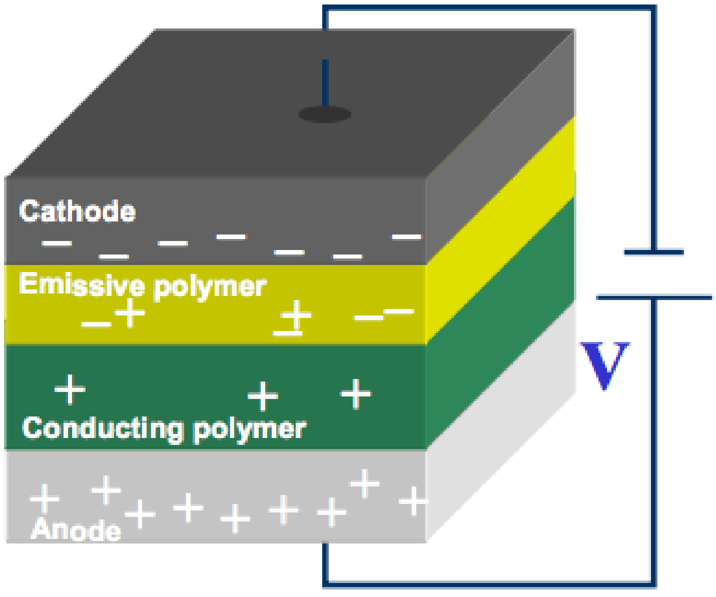
Organic metals practical applications.

OLED Technology

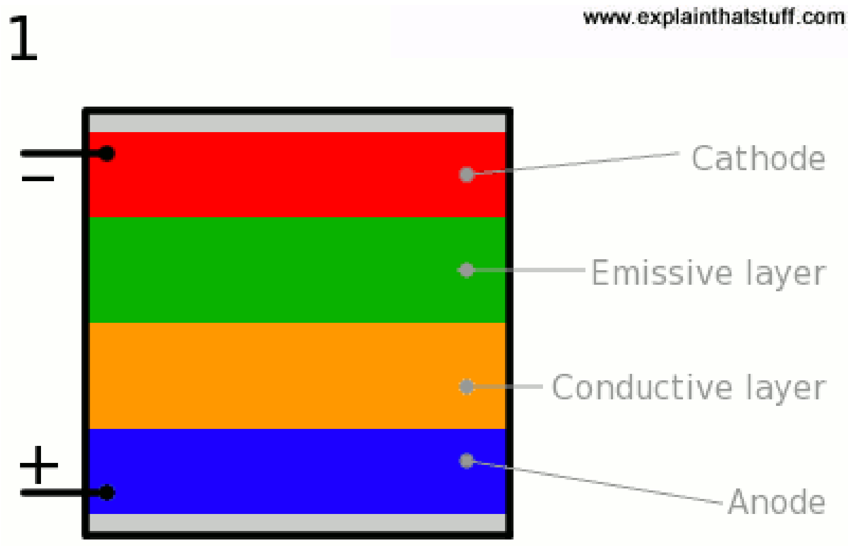


OLED Diode

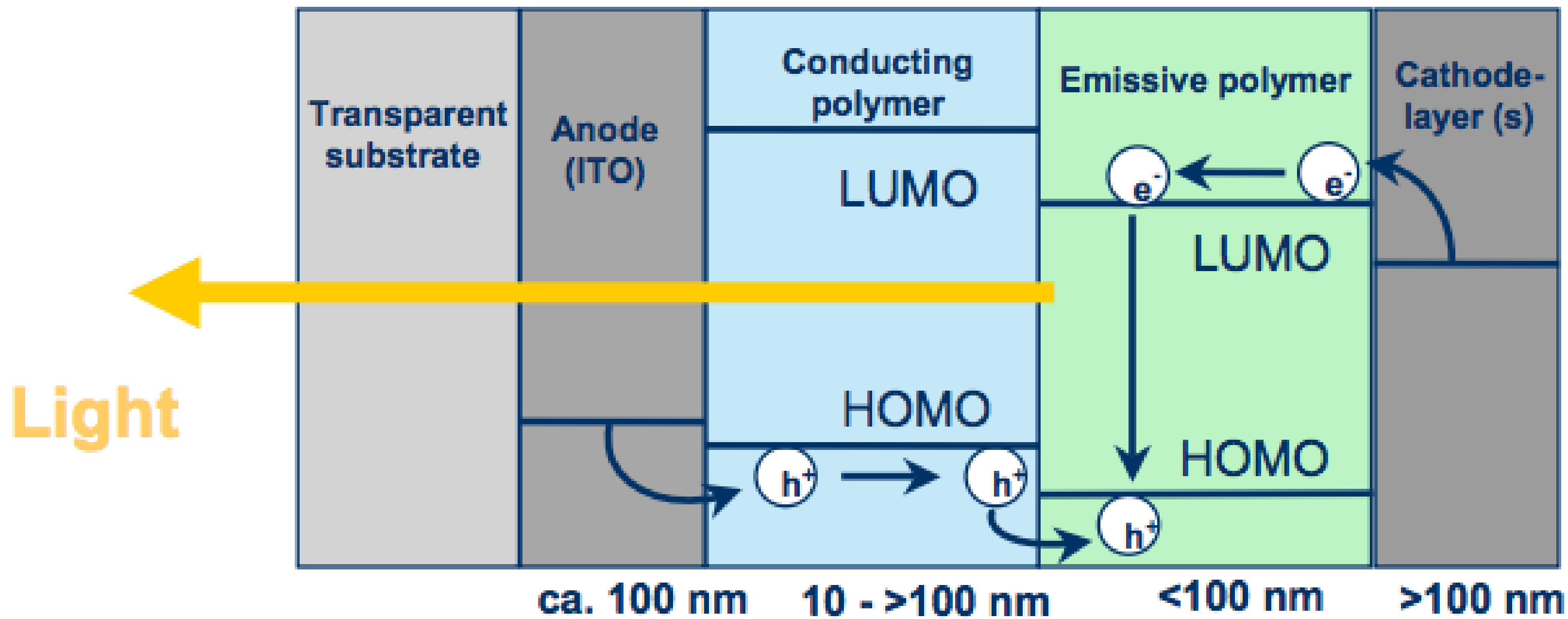


OLED diode

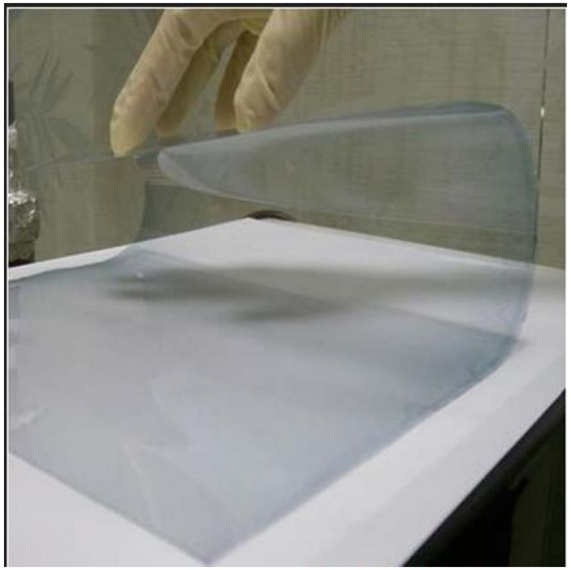
1. As the electricity starts to flow, the cathode receives electrons from the power source and the anode loses them (or it "receives holes,").
2. Now we have a situation where the added electrons are making the emissive layer negatively charged, while the conductive layer is becoming positively charged .
3. Positive holes are much more mobile than negative electrons so they jump across the boundary from the conductive layer to the emissive layer.
4. When a hole meets an electron, release a brief burst of energy photon.



OLED technology

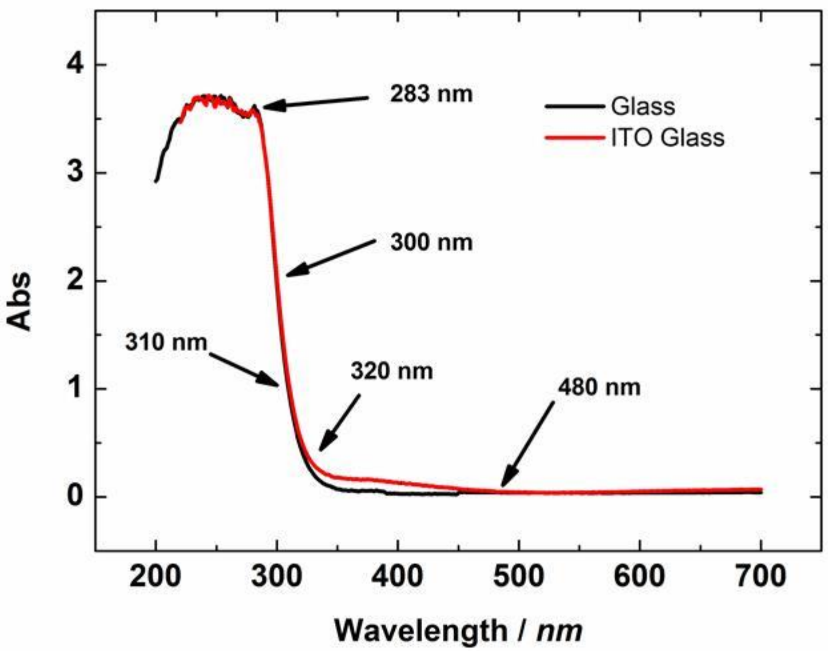


ITO Indium Tin Oxide



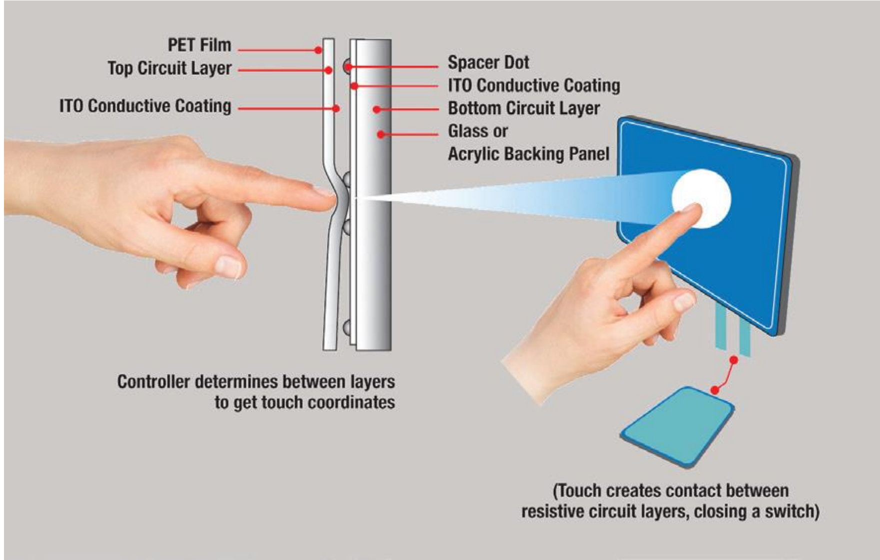
Transparent Conductive Flexible ITO-Coated PET Film 40~60ohm/sq

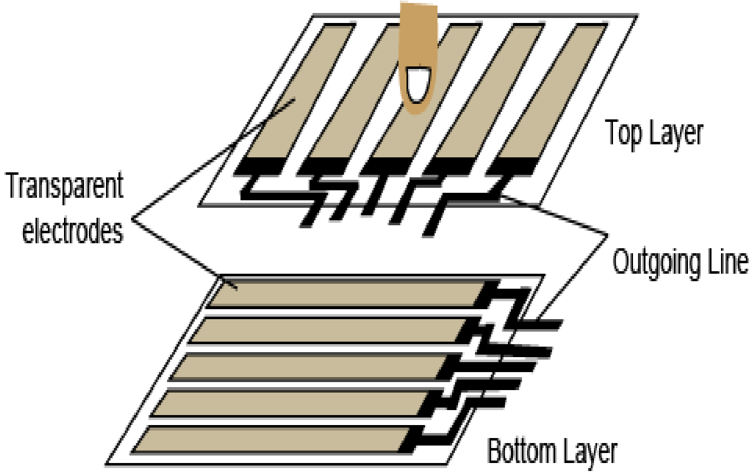
www.ebay.com



Typical ITO composition is 74% In, 18% O_2, and 8% Sn by weight.

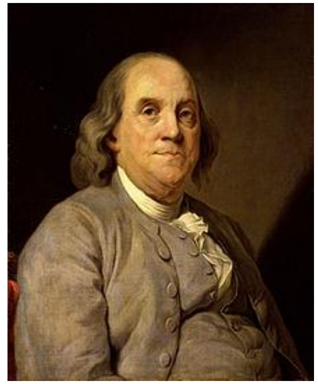
ITO & Resisitive Touch Screen controllers



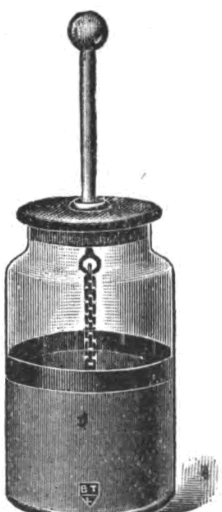


Texas Instruments www.ti.com

ITO Capacitive Touch Screen controllers

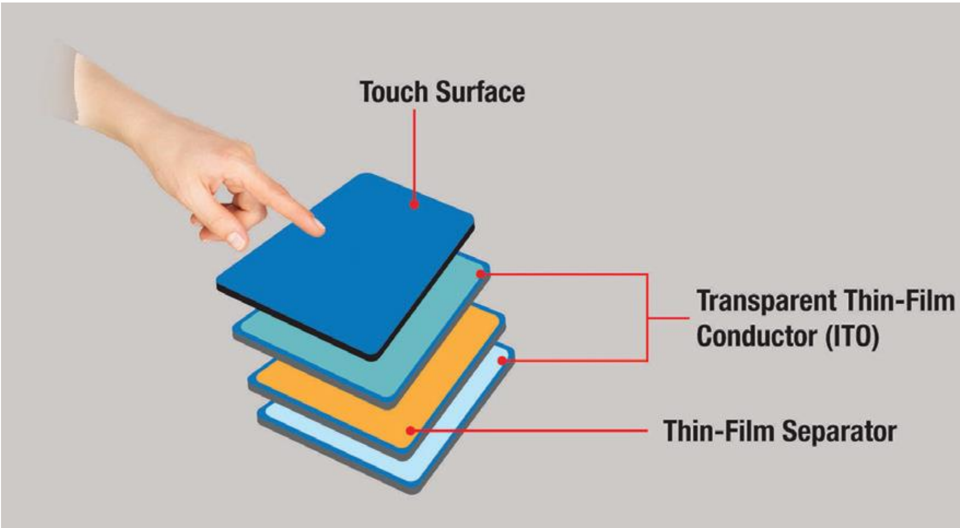


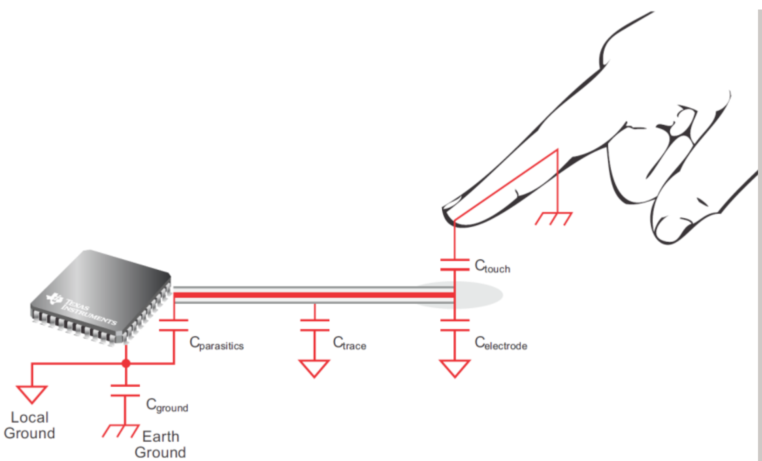
Benjamin Franklin
1706- 1790

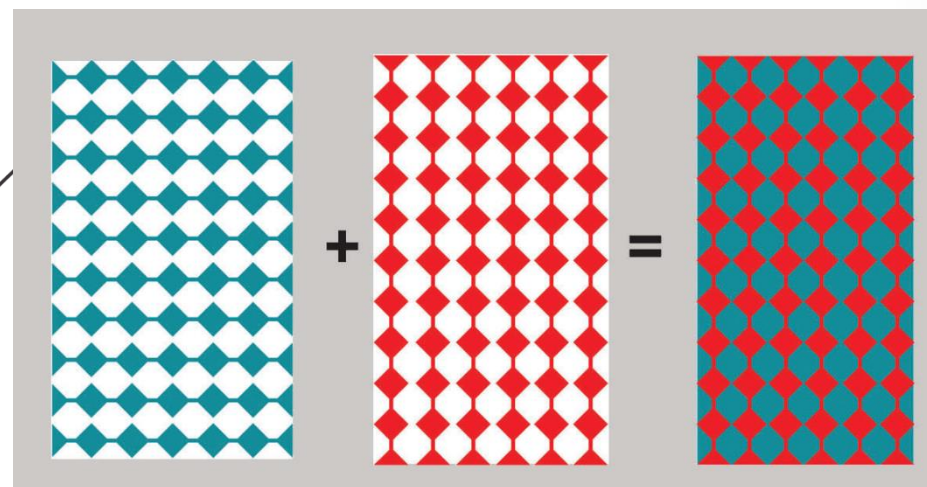


Ewald Jürgen Georg von Kleist from Kamień Pomorski 1700-1748 and Pieter van Musschenbroek 1692- 1761 invented Leiden jar (capacitor) in 1746

ITO Capacitive Touch screen controllers



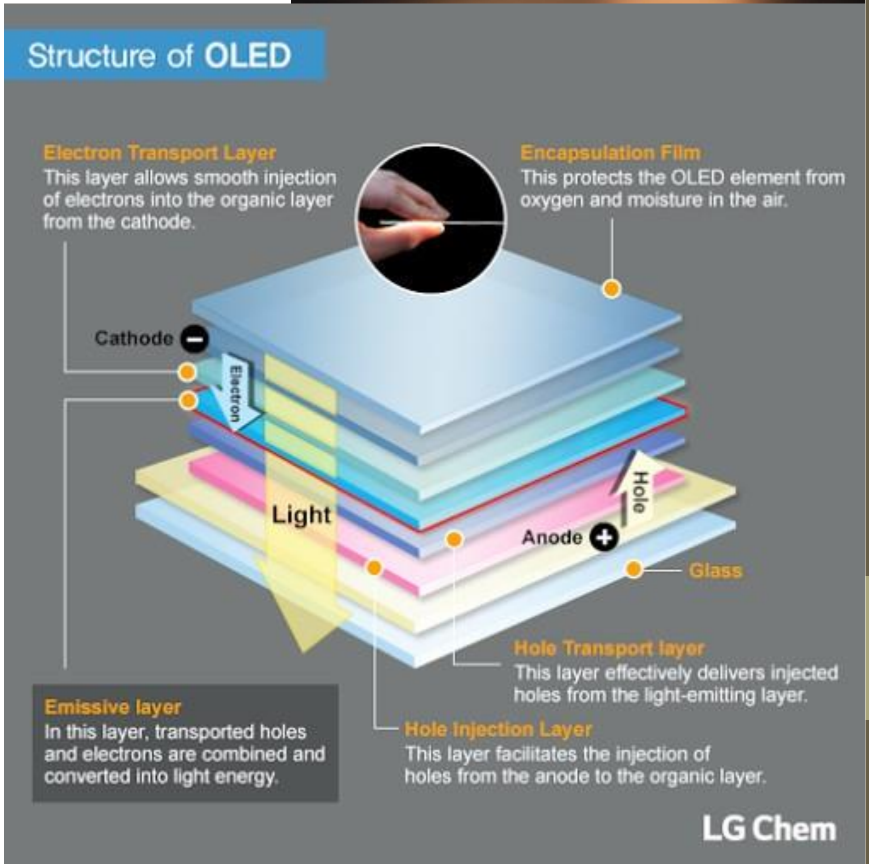




ITO rows and columns are overlaid to make one full sensor sheet

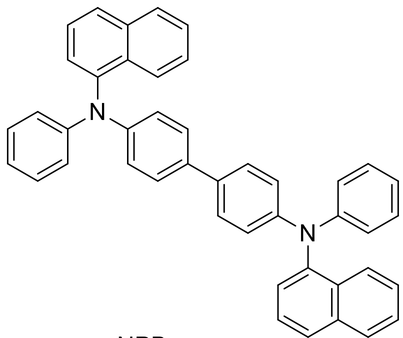
Texas Instruments www.ti.com

OLED lighting panels

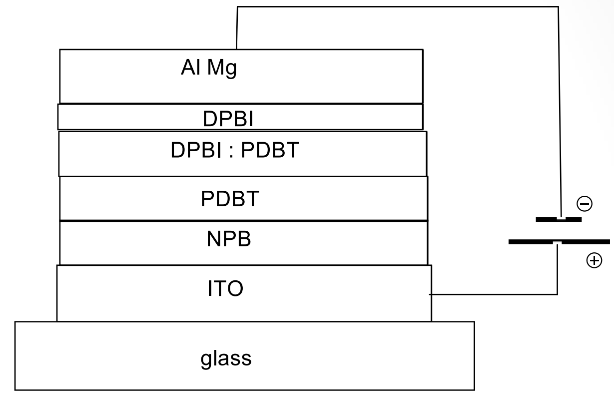


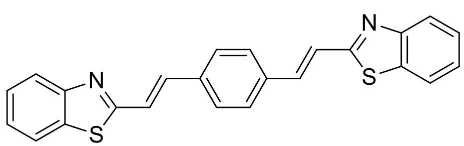
Price: $210
OLED light panel Lifetime: 40000hours
Thickness: 0.88mm
Size: 100x100 mm
Efficacy: 60lm/W

Polymer Light-Emitting Diodes



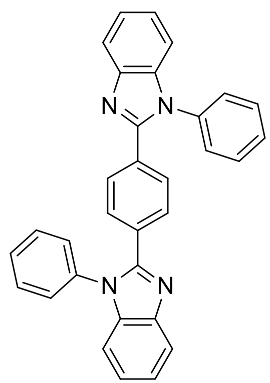
NPB
hole-transporting layer





1,4-bis((*E*)-2-(benzo[*d*]thiazol-2-yl)vinyl)benzene

PDBT
Fluorescent dye



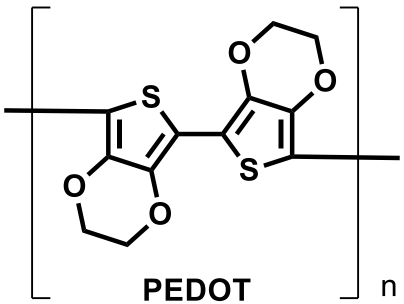
DPBI

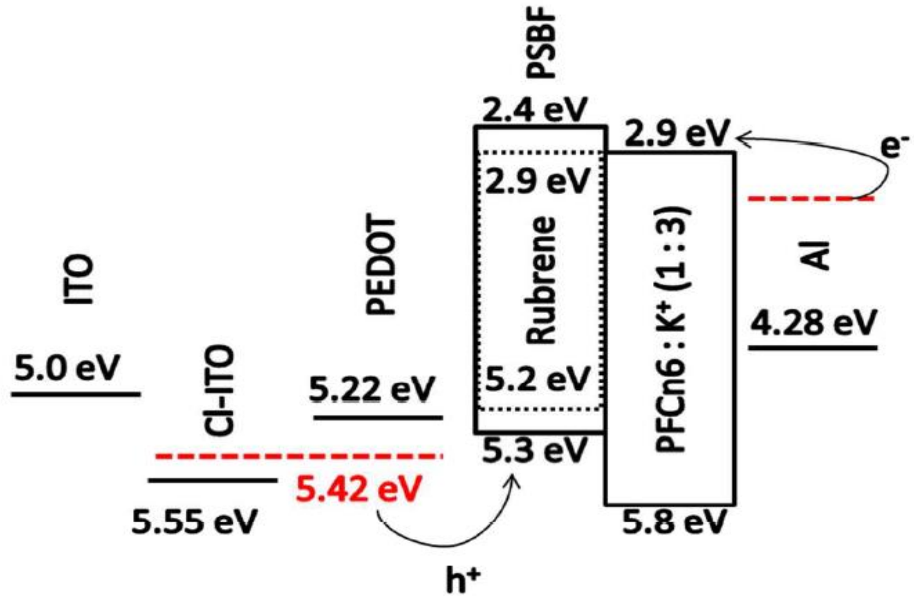
electron transporting layer

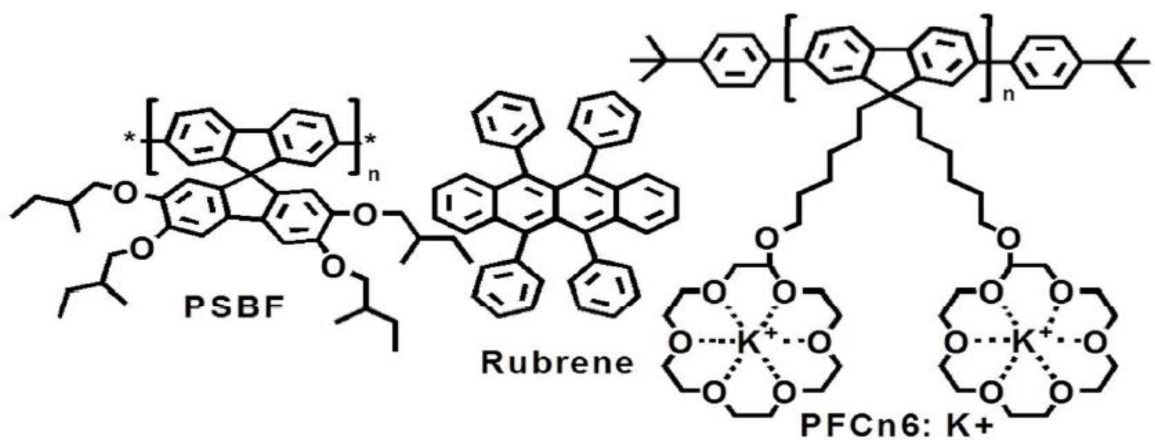
Example 1
a) an ITO-coated glass Was ultrasonically cleaned sequen tially in a commercial detergent, iso-propanol, ethanol, and methanol, rinsed in deionized water, and then dried in an oven. The substrate Was further subjected to a UV- treatment for 10—20 minutes;
b) the substrate was put into a vacuum chamber, and the chamber Was pumped down to 6x10“6 mbar;
c) a 70 nm thick NPB hole-transporting layer was depos ited on ITO;
d) a 3.5 nm thick PDBT emitting sub-layer Was deposited on NPB layer;
e) a 30 nm thick DPBI:PDBT(2%) emitting sublayer was deposited on PDBT layer;
f) a 30 nm thick DPBI electron-transporting layer Was deposited on DPBI:PDBT(2%) layer;
g) a 200 nm thick MgAg layer Was deposited on DPBI layer by co-evaporation from tWo sources (Mg and Ag)

US 6,521,360 B2

Polymer Light-Emitting Diodes

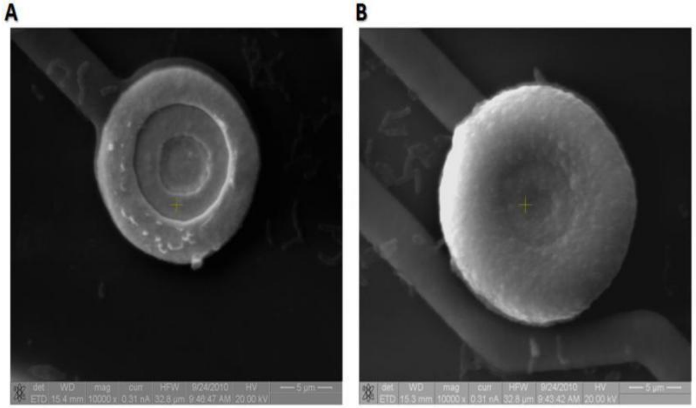




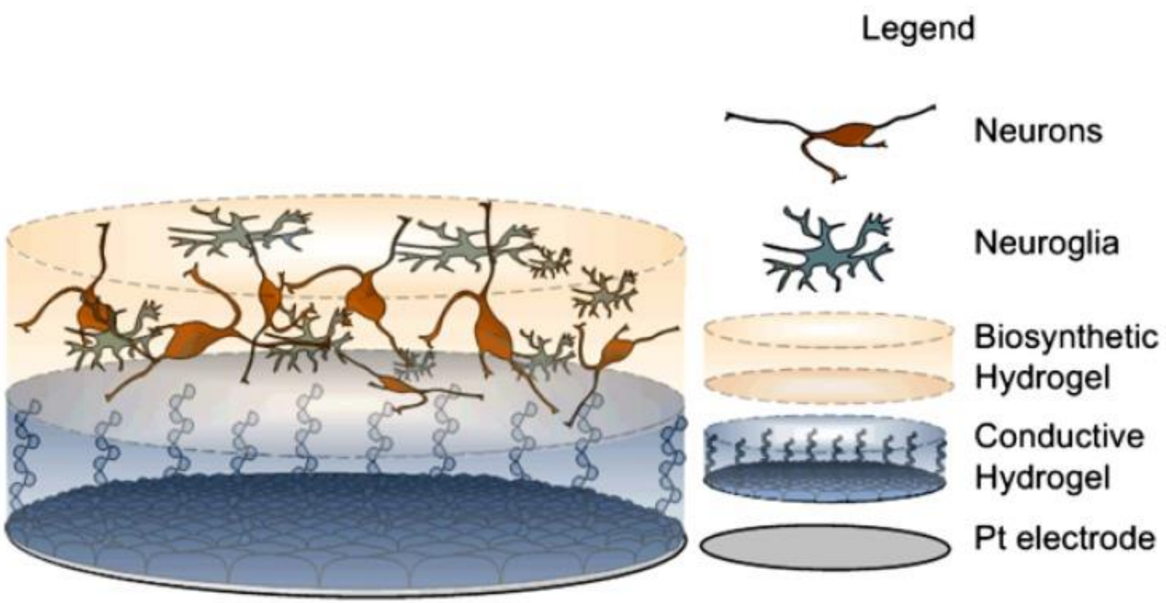


ACS Appl. Mater. Interfaces, Just Accepted Manuscript, December 29, 2016
DOI: 10.1021/acsami.6b09515

Neural interfaces

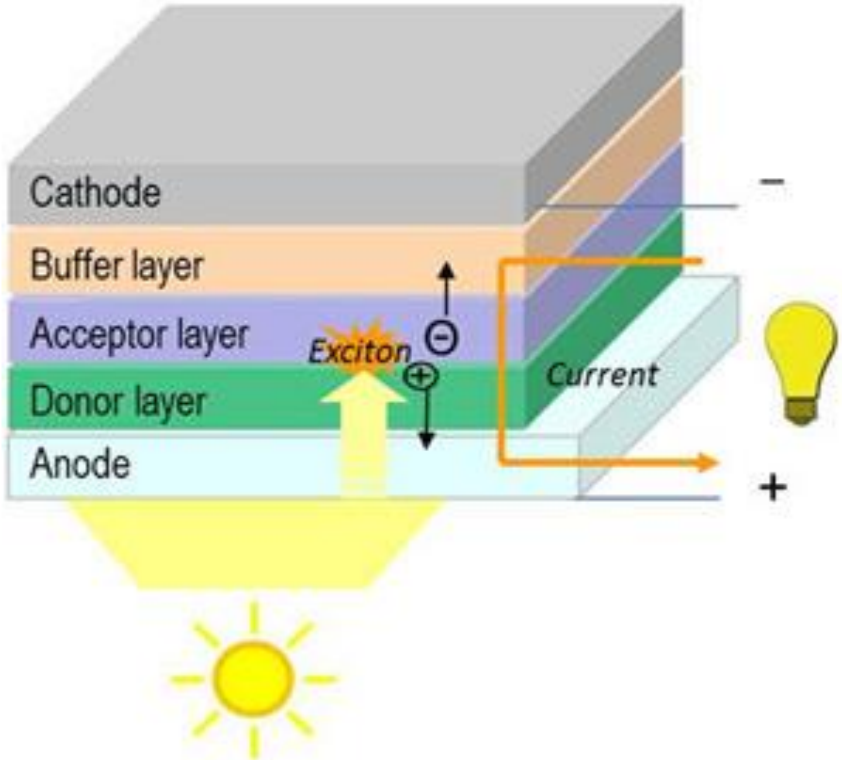


Scanning Electron Microscopy, PEDOT coatings
A) Depicts a PEDOT film generated using a deposition charge of approximately 260 mC/cm^2, and B) depicts a PEDOT film generated using a deposition charge of approximately 1600 mC/cm^2.
J Neural Eng. 2011 Feb;8(1):014001



Front Neuroeng. 2014; 7: 15.

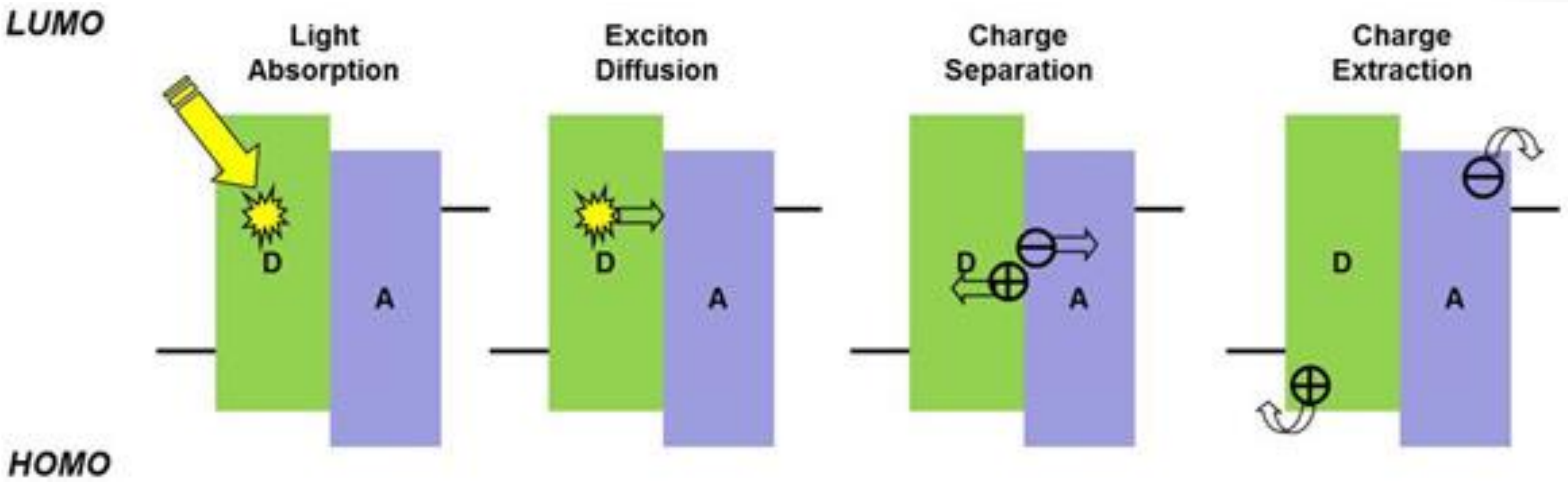
Organic Photovoltaics



Organic Photovoltaic (OPV) devices convert solar energy to electrical energy. A typical OPV device consists of one or several photoactive materials sandwiched between two electrodes.

www.sigma.aldrich.com

Organic Photovoltaics



In a bilayer OPV cell, sunlight is absorbed in the photoactive layers composed of donor and acceptor semiconducting organic materials to generate photocurrents. The donor material (D) donates electrons and mainly transports holes and the acceptor material (A) withdraws electrons and mainly transports electrons. As depicted in above figure, those photoactive materials harvest photons from sunlight to form excitons, in which electrons are excited from the valence band into the conduction band (**Light Absorption**). Due to the concentration gradient, the excitons diffuse to the donor/acceptor interface (**Exciton Diffusion**) and separate into free holes (positive charge carriers) and electrons (negative charge carriers) (**Charge Separation**). A photovoltaic is generated when the holes and electrons move to the corresponding electrodes by following either donor or acceptor phase (**Charge Extraction**)

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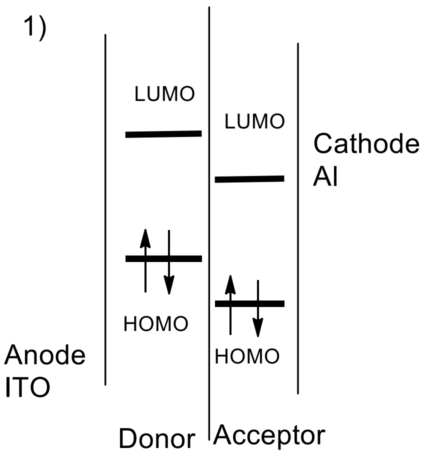
Organic Photovoltaics

1)



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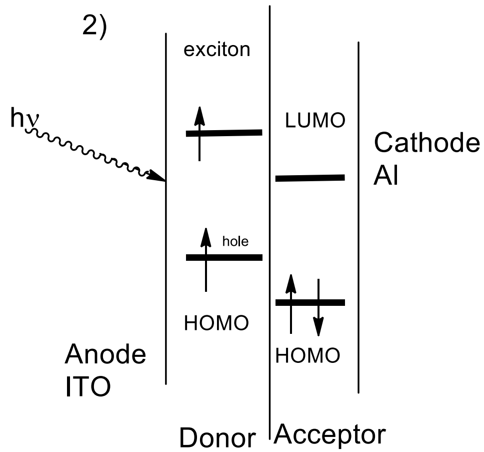

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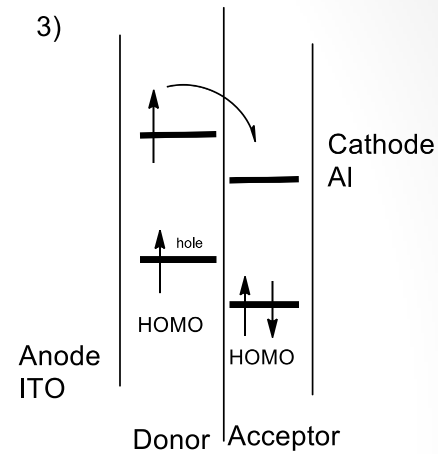

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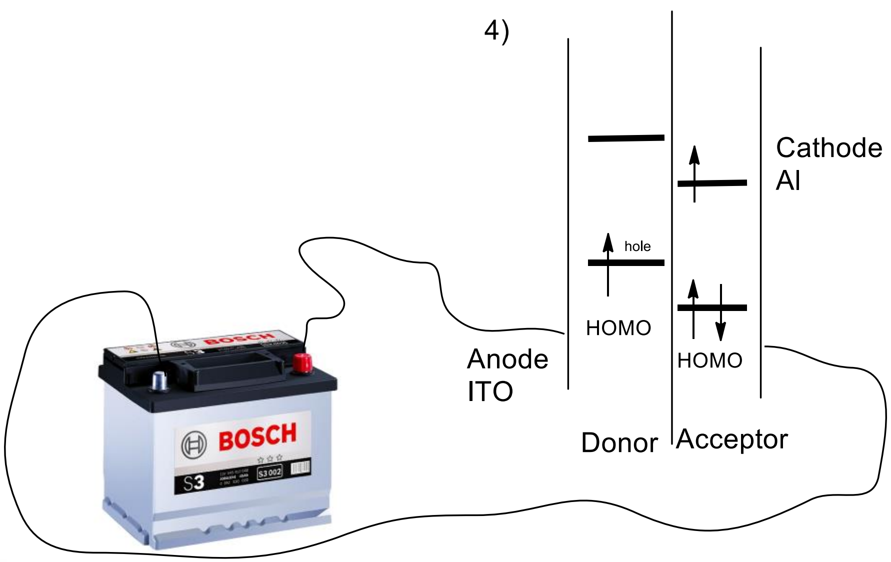
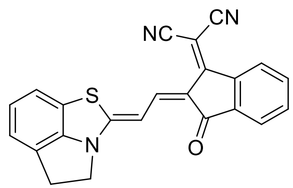
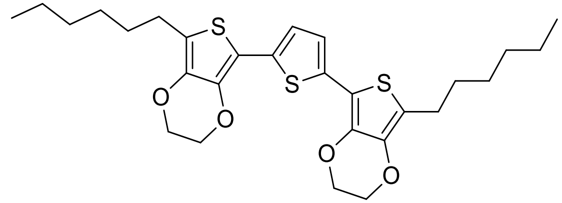


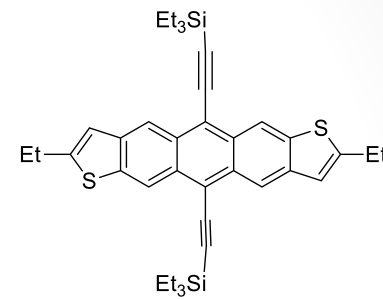
OPV Donor-Acceptor materials



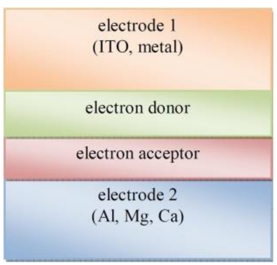
J. Mater. Chem. **2010** , *20* , 240

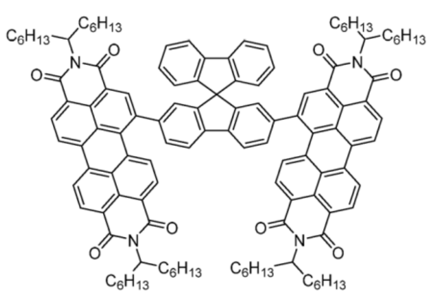


J. Mater. Chem. **2005** , *15* , 1589 .

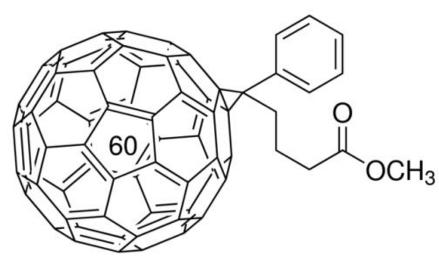


Organic Electronics **2006** , *7* , 243 .

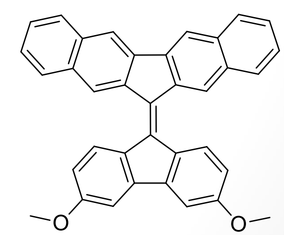




Acc. Chem. Res., **2015**, 48 (11), pp 2803–2812



[6,6]-Phenyl C_{61} butyric acid methyl ester
PCBM
Sigma-aldrich 100mg / 295 EUR



Ang. Chem. Int. Ed. **2010** 49 (3) 532-536