

Development of inks for lighting applications by printing processes over textiles.

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In this work, the results achieved thanks to the development of inks compatible with textile structures are presented. The goal is to provide lighting properties to fabrics through the deposition of multilayer structures by printing processes over electro reactive textiles.

Different coating techniques, as screen printing or ink-jet have been used to obtain conductive textiles. Over these textiles, different multilayer structures have been deposited to get fabrics with lighting properties.

To achieve the lighting functionality, we used commercial inks and inks developed by our centre. Inks have been formulated in order to obtain vehicles compatibles with textile materials.

One of the challenges of the project is to maintain the flexibility of the fabric after the deposition of the multilayer structure. This structure is based mainly on a conductive substrate, over there is deposited a dielectric layer that isolates the two electrodes and then an electroluminescent layer is deposited. Lastly, a transparent and conductive layer that allows light passes through is deposited (figure 1).

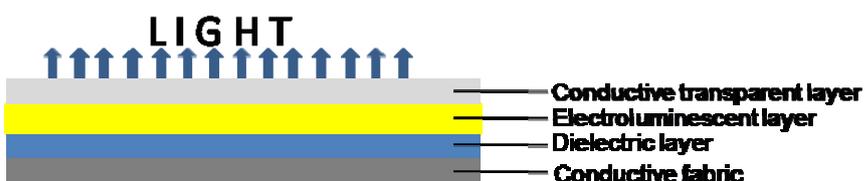


Figure 1. Electroluminescent structure

Electroluminescence is the result of radiative recombination of electrons and holes in a material (usually a semiconductor). The excited electrons release their energy as photons - light. Prior to recombination, electrons and holes are separated either as a result of doping of the material to form a p-n junction (in semiconductor electroluminescent devices such as LEDs), or through excitation by impact of high-energy electrons accelerated by a strong electric field (like phosphors in electroluminescent displays). Usually, the dopant defines the visible colour emitted and the semiconductor needs to have wide enough bandwidth to manage exit of light.

Decoration and security are some examples of the application of fabrics with lighting properties. In this sense, research on the development of electroluminescent yarns or OLED devices is also being carried out.

This work has been developed in CETEMMSA Technological Centre in collaboration with the EUETIB.