

RAW MATERIALS FOR TV COLORS

In the 1940s, it spread in Italy what nowadays is one of the most important means of communication and transmission in the world: the television. At the very beginning it could be seen only black-and-white; later on, February 1 1977, after a long technical-political battle, the color television officially appeared for the first time; due to the discovery of new chemical elements that will be named raw materials.



WHAT ARE RAW MATERIALS:

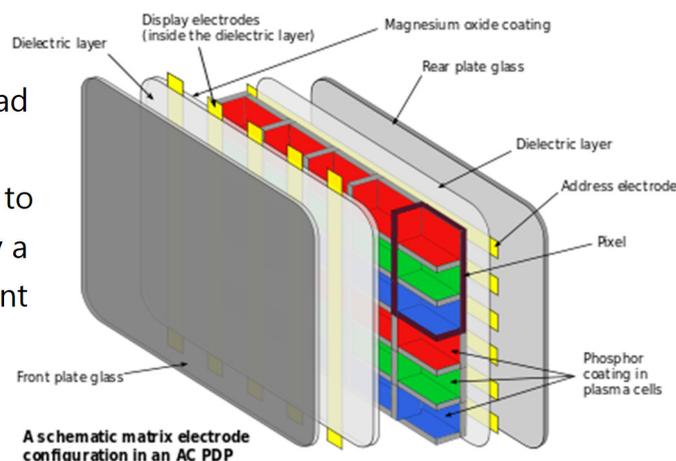
Raw materials are basic materials used to produce goods, finished products, energy or intermediate materials which are feedstock for future finished products. Even if they may be found in large quantity, they are not easily available with a high mining cost.

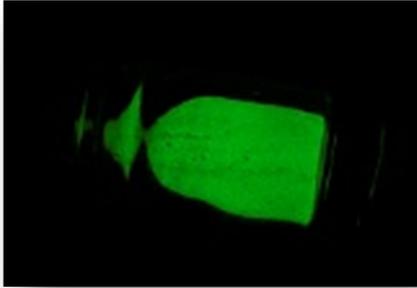
Terbium belongs to these particular group of elements and it is a member of lanthanide series. Its chemicals present 3 or 4 charge number, which means they can accept or lose 3 or 4 electrons: 3 valence terbium salts are basically colourless, the ones with a superior charge number are coloured. They are used in metal alloys and its oxide is employed in the green phosphors of the fluorescent light tubes and in the television screens, especially to create the green component. The blue one comes from europium +2 and the red one from terbium +3, also suitable as a raw material.

HOW COLORS CAN BE SEEN ON TELEVISION:

The television's screen is made of two glass panels with little cells in the centre containing an ensemble of noble gases. Gas kept in the cells is electrically transformed into plasma (fourth state of matter), to energize phosphors emitting light. The plasma formation is caused by the ionization of gases, in fact the formulated ions lead towards the electrodes colliding them and delivering photons, which are going to energize the phosphors to produce coloured light. Since every cell is covered by a phosphor, each of them is comparable to a fluorescent lamp.

Pixels, pointed elements which make an image, are composed of three separate sub-cells with different coloured phosphors: a sub-cell for the red light, one for the blue light and another for the green light. From the union of these lights, the pixels total color is created.





By varying the current pulses that flow along the cells (million times per second), the system may change or reduce the color intensity of every sub-cell, to create various combinations of green, red and blue. In this way it is possible to set up the major part of visible light.

HOW TO RECYCLE TERBIUM:

For the majority of raw materials, especially terbium, the first step to recycle them is to assemble several electronic devices (containing raw materials) and separate the different components by extracting raw materials and purifying them individually. Currently, as these processes are too complicated and expensive, no final solution has been found yet.

Main sources: https://it.wikipedia.org/wiki/Televisione_a_colori

<https://it.wikipedia.org/wiki/Terbio>

<http://www.raecycle.it/titolo1/>

https://en.wikipedia.org/wiki/Raw_material