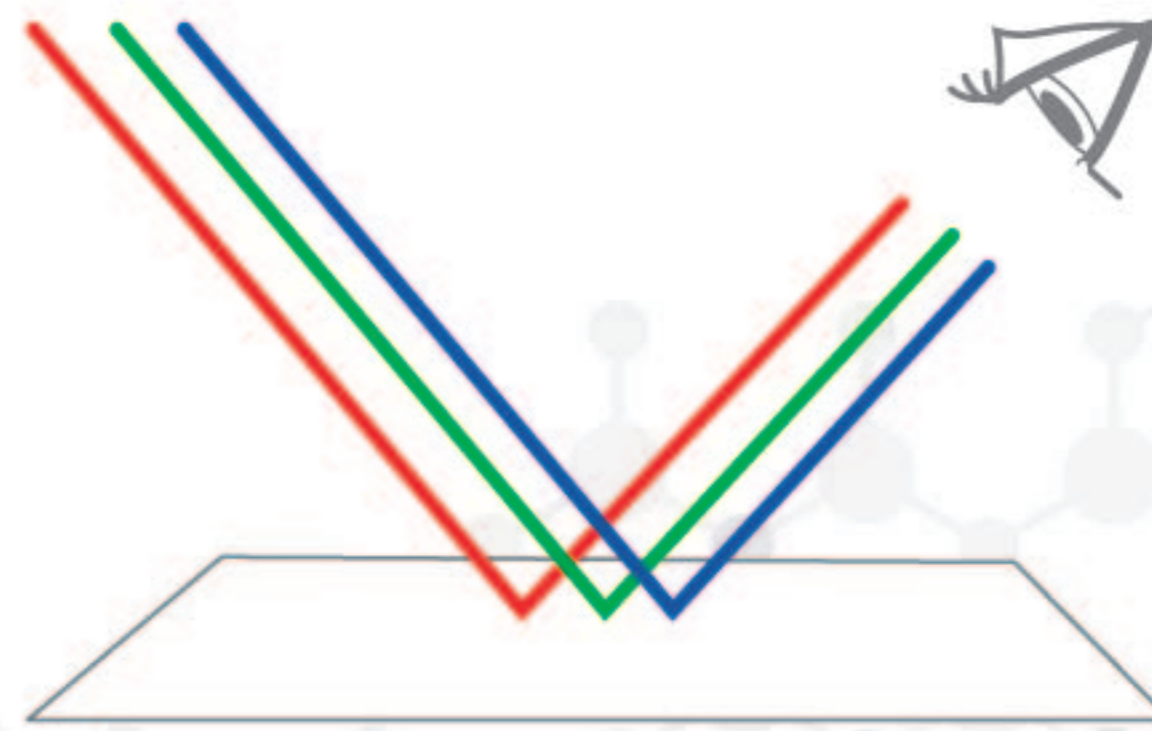


Absolute BLACK

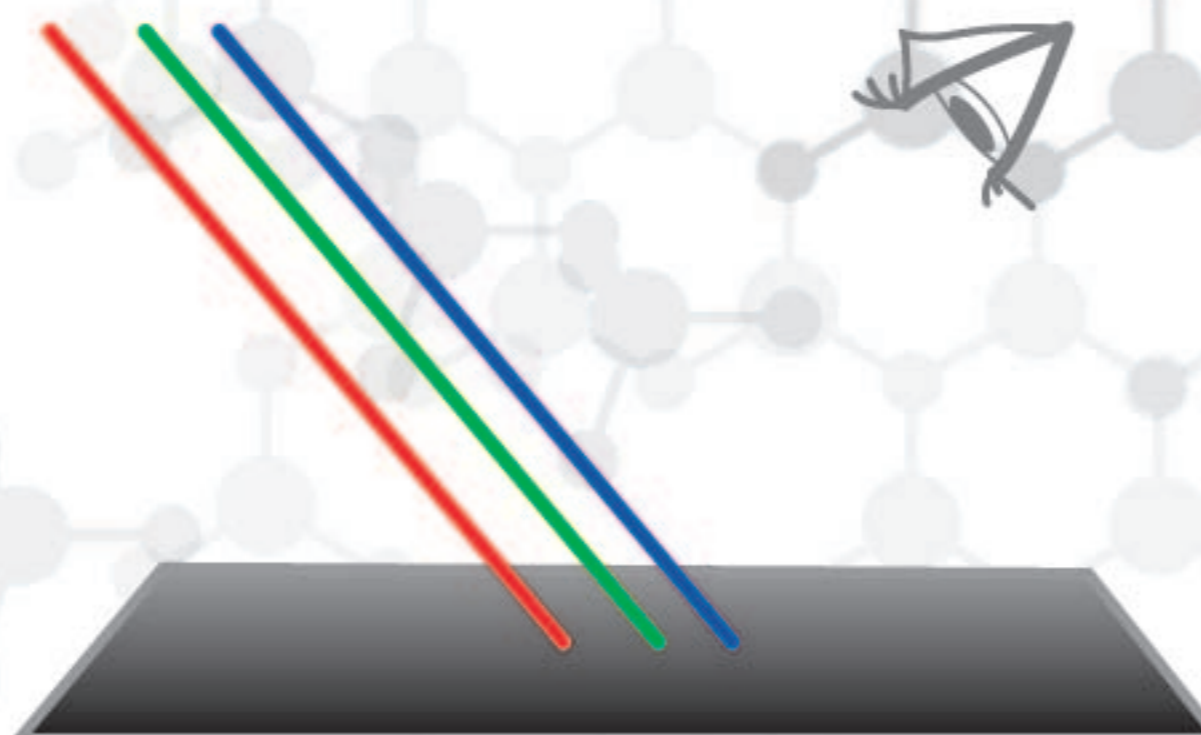
violet 400 nm indigo 450nm blue 500nm green 550nm yellow 600nm orange 650nm red 700nm



Our eyes are able to perceive only a small portion of the electromagnetic spectrum between 700nm (red) and 400nm (violet) called visible light.



Sunlight is **WHITE** because composed by an overlapping of all the frequencies of the electromagnetic spectrum

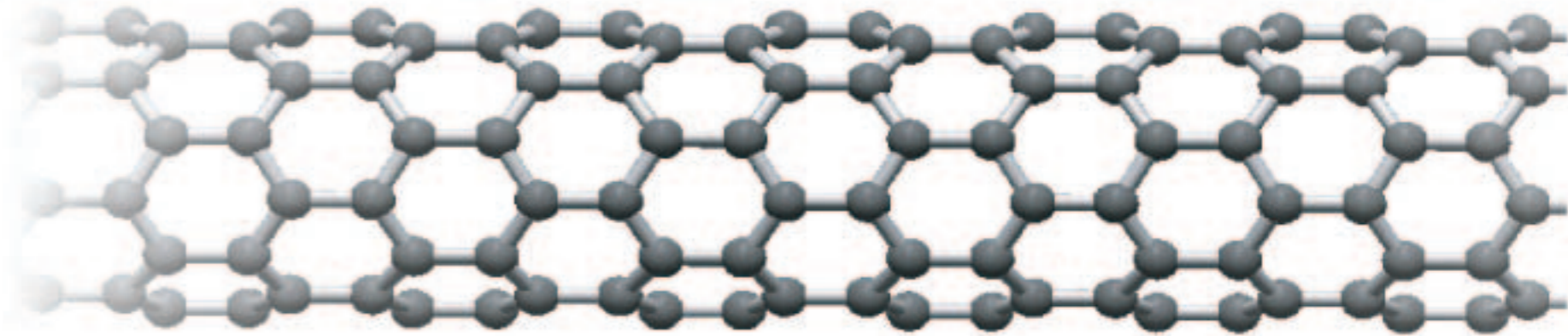


BLACK is defined a material able to **absorb completely all the visible radiations**, without reflecting anyone



Thanks to the research activities performed by Grado Zero Espace on nanoparticles' integration into different matrices, a new series of prototypes characterized by particular **aesthetic effects** has been developed.

Absolute  **BLACK**
Crystal



Prototypes realized with the following materials:

- PP + CNTs
- PA + CNTs
- POM + CNTs
- ABS + CNTs

This job gave birth to **Absolute Black** brand, a process allowing to obtain various polymeric materials, containing variable percentages of Carbon Nanotubes (CNTs) and other micro sized fillers, able to absorb very well all the visible spectrum radiations.



To obtain a **good “black” effect**, Grado Zero Espace studied and searched for a **pigment** with proper composition (**100% carbon**), particle size (**microns and nanometers**), porosity (high surface area) and **good integrability into the substrate**. GZE used, hence, **Carbon Nanotubes (CNTs)**, compounds made of only carbon atoms with a cylindrical structure composed by a sequence of hexagons (benzene). They appears like a very fine black powder totally insoluble, but it is possible to create a good dispersion of them into various matrices using proper techniques and additives.



Following the research studies performed by **the American Rensselaer Polytechnic Institute, which obtained the darkest material ever made by man** (reflective index 0.045 % - 150 times less than conventional black paint) with a thin coating composed by vertically-aligned Carbon Nanotubes, Grado Zero Espace dispersed a low amount of CNTs and micro sized fillers mixture into some polymeric matrices.



The results, obtained by a proper dispersion of this black pigment into a polymeric matrix using suitable techniques to guarantee the greatest **homogeneity and stability**, was an article able to **absorb very well all the visible radiations** with an excellent **aesthetic effect**. Besides, bulk dispersion allows a good workability of the final product simplifying the damages' recovering and permitting to customize brightness and opacity effects according with the chosen application. Absolute Black is black inside and outside, so even if **scratched**, it maintains own **homogeneous black colour**.



Absolute  **BLACK**