www.graphene.avanzare.es
This laminar carbon material, is set to become the material of the 21st century thanks to its versatility. In the recent years graphene has attracted a great deal of attention due to its potential application in many different areas such as nanoelectronics, ultracapacitors, gas sensors, catalyst supports.

There is a vast range of current and prospective applications of graphene in multiple industries.

Avanzare has extensive expertise in 2D materials research, production and industry applications and offers different graphene grades classified into the following categories:

- **Pristine graphene**
  - PRIST
- **Highly reduced graphene oxide**
  - 70-1-2.5
  - 40-1-2.5
  - 70-3-3.5
  - 40-3-3.5
- **Partially reduced graphene oxide**
  - 70-3-8
  - 40-3-8
  - 70-3-20
  - 40-3-20
- **Graphene oxide**
  - GOX-70
  - GOX-40
- **Graphene/Graphite nanoplatelets**
  - PLAT-2
  - PLAT-7
  - PLAT-40
  - PLAT-70

+ Tailor-made graphene to meet our customer’s requirements
Pristine graphene

av-PRIST
Lateral size 100-500 nm
Highly reduced graphene oxide

**av-70-1-2,5**

- Lateral size (LD50): 70 µm
- Average thickness: <1nm
- Oxygen content (XPS): 2,5%
- BET: 416 m²/g
- Average number of layers <3

**av-40-1-2,5**

- Lateral size (LD50): 40 µm
- Average thickness: <1nm
- Oxygen content (XPS): 2,5%
- BET: 480 m³/g
- Average number of layers <3
av-70-3-3,5

Lateral size (LD50): 70 µm
Average thickness: 2-3 nm
Oxygen content (XPS): 3,5%
BET: 230 m²/g
Average number of layers <10

av-40-3-3,5

Lateral size (LD50): 40 µm
Average thickness: 2-3 nm
Oxygen content (XPS): 3,5%
BET: 225 m²/g
Average number of layers <10
Partially reduced graphene oxide

### av-40-3-8
- Lateral size (LD50): 40 µm
- Average thickness: <3 nm
- Oxygen content (XPS): 8%
- BET: 260 m$^2$/g
- Average number of layers <10

### av-70-3-8
- Lateral size (LD50): 70 µm
- Average thickness: <3 nm
- Oxygen content: 8%
- BET: 280 m$^2$/g
- Average number of layers <10
**av-70-3-20**

Lateral size (LD50): 70 µm
Average thickness: <3 nm
Oxygen content (XPS): 20%
BET: 220 m²/g
Average number of layers <10

**av-40-3-20**

Lateral size (LD50): 40 µm
Average thickness: <3 nm
Oxygen content (XPS): 20%
BET: < 200 m²/g
Average number of layers <10
Graphene oxide

**av-GOX-70**
- Lateral size (LD50): 70 µm
- Average thickness: 1-2 nm
- Oxygen content (XPS): 30%
- BET: approx. 400 m$^2$/g
- Average number of layers 1-2

**av-GOX-40**
- Lateral size (LD50): 40 µm
- Average thickness: 1-2 nm
- Oxygen content (XPS): 30%
- BET: approx. 400 m$^2$/g
- Average number of layers 1-2
Graphene/graphite nanoplatelets

**av-PLAT-2**

- Lateral size (LD50): 2 µm
- Average thickness: <10 nm
- Oxygen content (XPS): <1%
- BET: > 200 m²/g
- Average number of layers: multilayer (<20)

**av-PLAT-7**

- Lateral size (LD50): 7.2 µm
- Average thickness: 3 nm
- Oxygen content (XPS): <1%
- BET: 70 m²/g
- Average number of layers: multilayer (5-10)
Graphene/graphite nanoplatelets

**av-PLAT-40**
- Lateral size (LD50): 40 µm
- Average thickness: 10 nm
- Oxygen content (XPS): <1%
- BET: 22 m²/g
- Average number of layers: multilayer (<30)

**av-PLAT-70**
- Lateral size (LD50): 70 µm
- Average thickness: 10 nm
- Oxygen content (XPS): < 1%
- BET: 28 m²/g
- Average number of layers: multilayer (<30)
Graphene-related projects

**GRAPHENE FLAGSHIP**
Graphene Flagship is the EU’s biggest research initiative ever. With a budget of EUR one billion, the Graphene Flagship project has the ambition to take graphene and related materials from the research laboratories to industrial exploitation in a huge range of application areas.  
http://www.graphene-flagship.eu/

**POLYGRAPH PROJECT**
Will develop new production techniques to deliver industrial-scale quantities of graphene-reinforced thermosetting polymers, suitable for use in a number of key applications where improvements are needed in the strength, stiffness, toughness, electrical conductivity and thermal properties.  
http://www.polygraphproject.eu/

**PHOENIX PROJECT**
Synergic combination of high performance flame retardant based on nano-layered hybrid particles as real alternative to halogen based flame retardant additives.  
http://www.phoenix-eu-project.eu/index.php

**THELINK PROJECT**
Aims to generate knowledge on the relationship between nano/micro structures and macro-level properties and on exploiting the potential of nanostructured polymers. The project ultimately intends to transfer that expertise along the material development chain from design to production.  
http://www.thelink-project.eu/
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