

## TECHNO OFFER

### Manufacturing process of Graphene Quantum Dots

Keywords : Carbon / GQDs / Graphene / Quantum dots / nanometer / green chemistry / electronics



#### CONTEXT

The properties of nanoparticles are proving more and more applicable.

It is now necessary to master both the large-scale and low-cost production of these very reactive elements, that is to say to master the reproducibility of the geometries, size distributions, the purity of the elements and their possible functionalization.

This production is also attached to a toxicological component during manufacture, followed by the use and then the end of life of products incorporating these nano-objects.

#### DESCRIPTION

The process concerns the manufacture of Graphene Quantum Dots (GQDs), that is to say nanoparticles derived from carbon whose dimensions are between 2 and 20 nanometers (the size distribution and its reproducibility are controlled)

The origin of carbon comes from any organic product, especially plants, by an extraction method specific to the process.

The packaging is either in solution (pure water or organic solvents) or in dry form.

A posteriori functionalization increases quantum efficiency.

#### COMPETITIVE ADVANTAGES

- Size ranges: 2 to 20 nm
- Size distribution: <5 nm
- High purity of graphene
- Non-toxic (vs CdSe, CdTe ...)
- Excellent solubility in organic or aqueous solvents
- Extended emission performance (on dry film: Full spectrum of white light)
- A posteriori functionalization
- Packaging in solution or Dry



#### Markets & applications

- ❖ Optoelectronics
- ❖ Electronic
- ❖ Solar energy
- ❖ Green chemistry
- ❖ Composite materials
- ❖ Medical imaging



#### Development stage

Laboratory scale prototype validation (TRL 3)



#### Research team

University of Lorraine - CNRS



#### Intellectual property

Know-how



#### Target partnership

Co-maturation

#### CONTACT-US

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