DGTec

The different powder way

NANOPOWDER TECHNOLOGY PROVIDER

Small particles for large effects

Date

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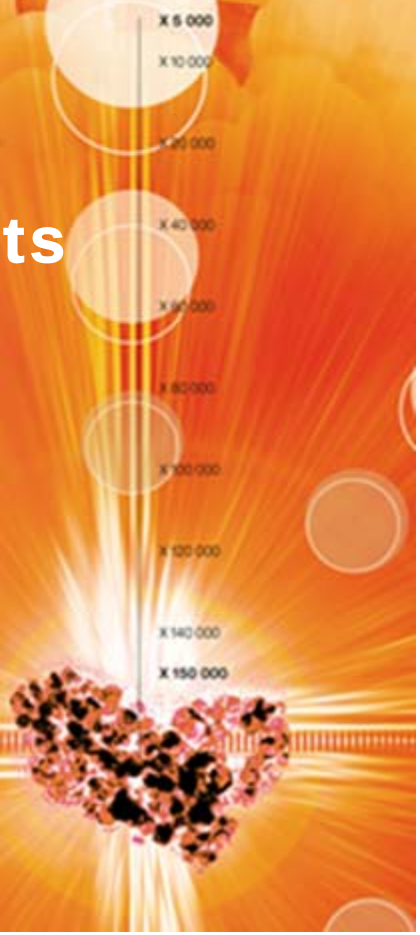

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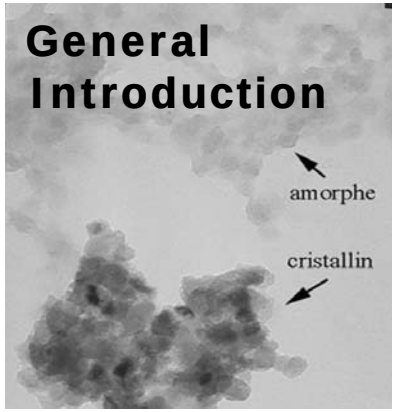
General Introduction

Why nano's ?

Exemples

From earth to space

Nanomaterials and Nanotechnologies



Nanotechnologies :
complex 3D products with complex functions

Only few interactions

Nanofillers :
action in volume

Nanomaterials :
nanometric objects

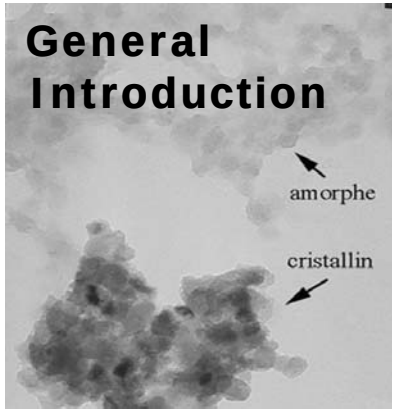
Nanocoatings :
Action in surface

Product development in progress

Already available

Nanomaterials is a domain connex to Nanotechnologies

Three families of Nanomaterials

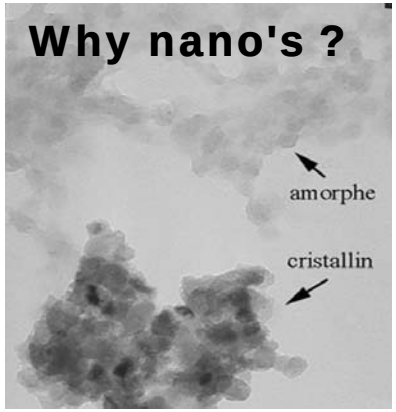


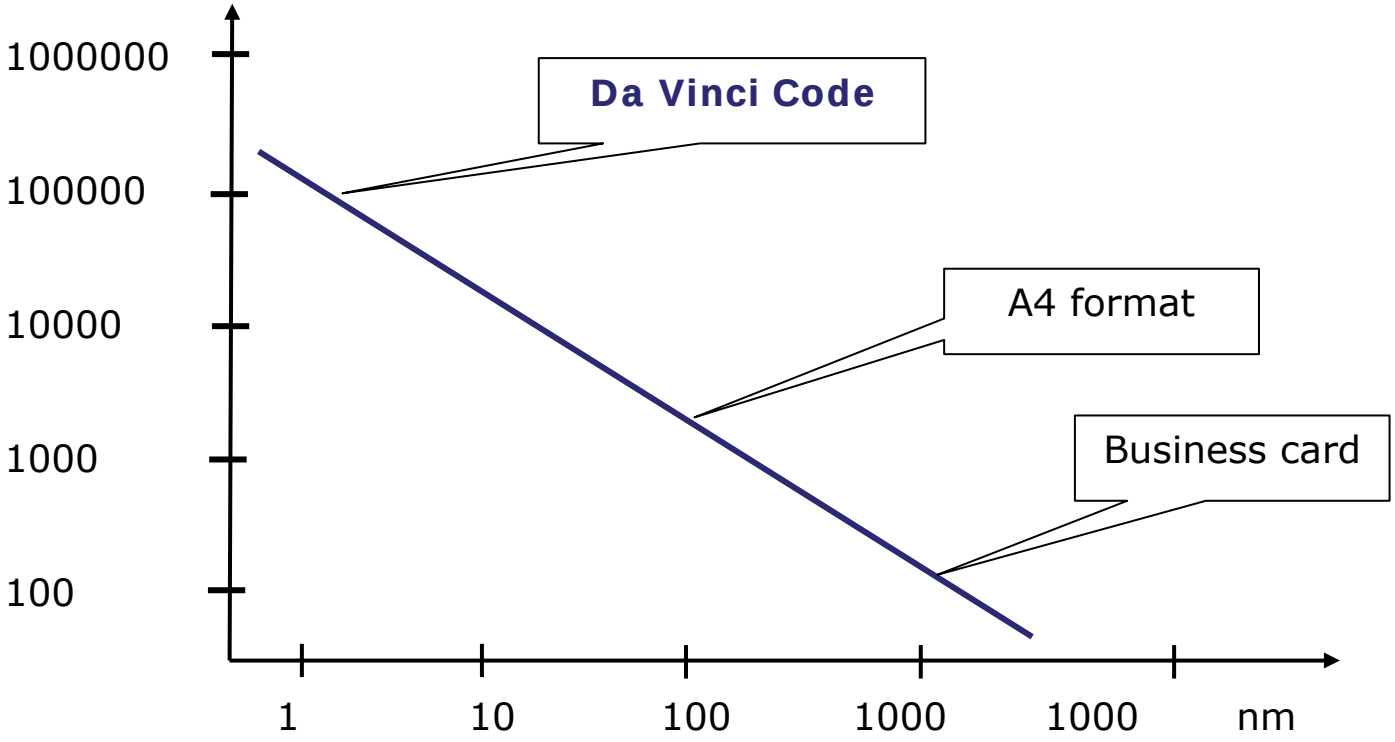
1 D	2 D	3D
Clays	Nanowires nanotubes	DGTec: Nanoparticles
Silicate	Carbon Noble metals	Oxides, Noble metals, Borides, Nitrides, Carbides, Organoceramics, Metals

Effects, way of use, compositions depends upon the shape of the nanomaterial

An active surface for large effects at low concentrations

Specific Surface = sum of the surface of all grains forming one gram of matter
(m²/g)

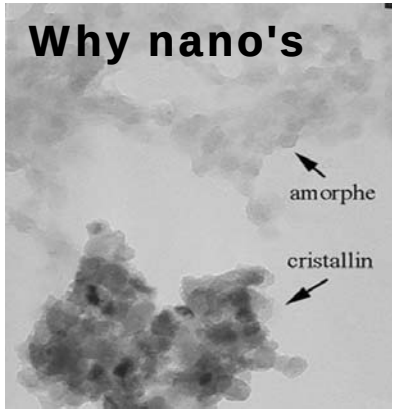




A best seller in an espresso !

Assumptions : specific gravity = 3g/cm3, concentration = 1%

An active surface interacting with the environment



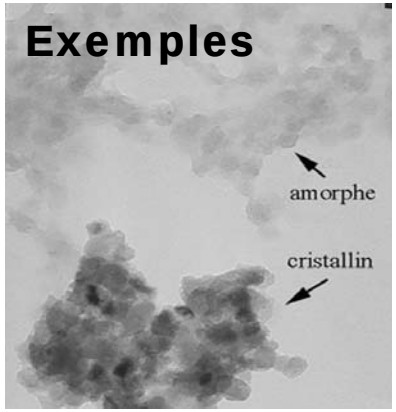
- Electromagnetic
  - Filtering
  - Reflecting
- **Physico chemical : action in volume**
  - thermoplastic properties
  - fire resistance
  - toughness
- **Physico chemical : action in volume**
  - Catalysis
  - Biocids, bactericids
  - Corrosion

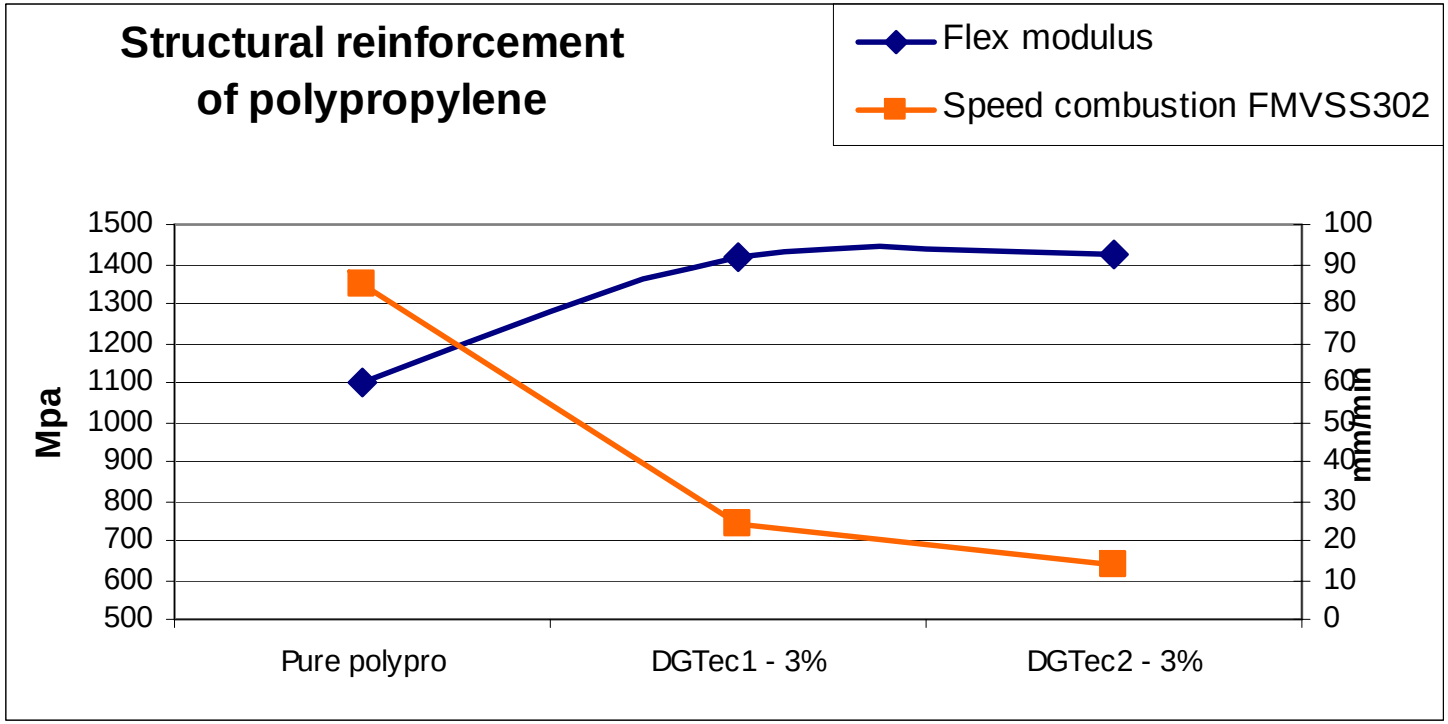
Nanomaterials are intrinsically multifunctional

Small size → High Surface Energy → Interaction

Composition → Chemical functionality

Case of polypropylene

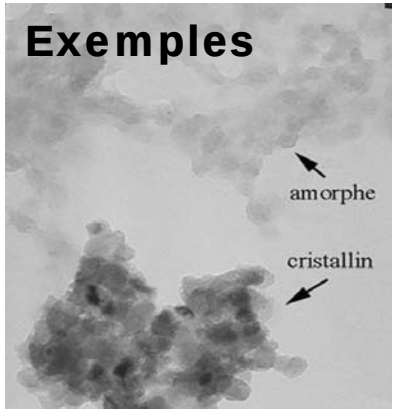


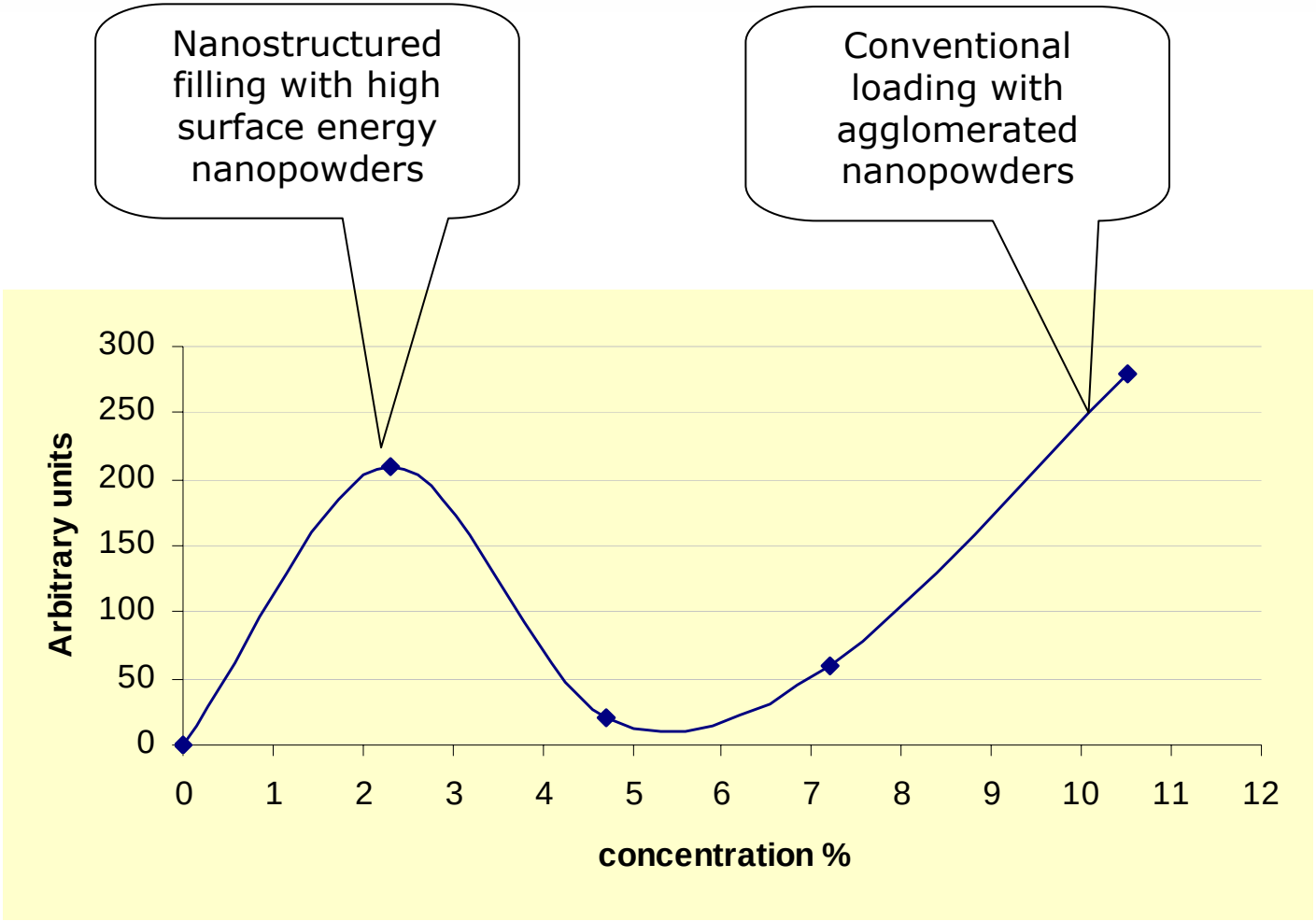


Two functions in one time

Without any specific optimization

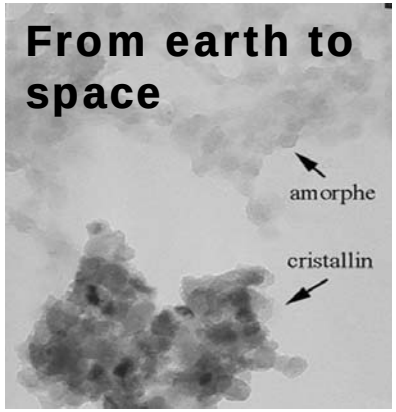
Case of Epoxy





Two much nanos kills nano !

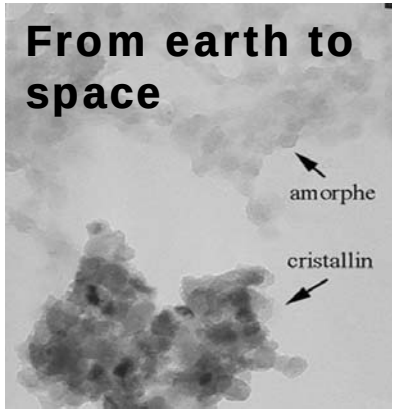
Nanomaterials everywhere on earth



Huge variety of applications

- Tools
- Machinery, equipment
- Consumer products
- Transportation : trains, cars, aircrafts
- Energy : fuel cell
- Medicine : drug delivery, in situ treatments
- Biology : pathologies detection
- Environment : catalysis, filtration
- In house : paints, varnishes
- Sports : farts, composites,
- And so on.

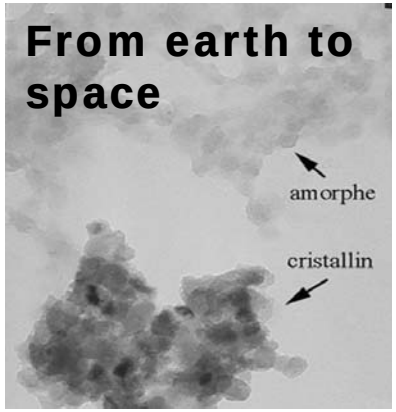
Nanomaterials everywhere in space ?



If it works on the ground, it should work elsewhere…

- Chemical propulsion systems
- Nuclear propulsion and power systems
- Structure and vehicle systems
- Space systems
- Integrated vehicle health monitoring
- Nanostructured materials
- Nanocoatings (hard and soft)
- Nanomaterials for reinforcement
- Nanomaterials, nanocoatings
- Nanomaterials for sensors

Feet on the ground



Thank you for your attention

Since months, teams of specialists are overworked!... And this only to play the fool, of course ?...

Head in the stars