

Nanomaterials: industrial applications in security and defense

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Nowadays the industry is fascinated with the extraordinary properties of nanoparticles due to the impact on the performance of nanoenabled products.

However there are several bottle necks in the industrial applications of nanomaterials:

- 1) Dispersion and re-agglomeration problems produce micro-materials instead of nanomaterials. Most of the nanoproducts (High BET SiO₂, carbon black, natural nanoclays and a great part of the nanopowders) are not real nanoproducts because of they agglomerate producing microparticles-microcomposite instead of a nanocomposite
- 2) Release of NP into the air when they are in solid form causing health and environmental problems
- 3) Processing difficulties that in most cases make the process unviable due to their low apparent density
- 4) Necessity of customization for each application and client: nanoparticles aren't no ready to be directly used
- 5) From the economical point of view the cost of the particles and high shipping costs caused by their low apparent density of de-agglomerated materials became unaffordable.

It is necessary to solve all of these problems to obtain real industrial application of the nanoparticles.

There are several applications of nanomaterials in the Security and Defense sector, due to the performance of the real nanocomposites:

- Thermal dissipation for their use in tanks
- Nanomaterials for their use in bulletproof
- EMI Shielding
- Energy absorbing materials
- High performance composites

Other applications of nanomaterials in Security and Defense in the use on nanobiosensors.