

REMARKS TO FUTURE DESIGN OF MULTIFUNCTIONAL NANOPARTICLES AND STRUCTURE-TUNED MATERIALS

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Abstract

Multifunctional Nanoparticles Technology MFNPT is considered worldwide as the next 'big revolution'. In particular, knowledge based nanocolloid growth, nanoparticles surface engineering along with Up-scaling count to the most challenging activities. However, future highly competitive nanobiomarkets will desire a rapid screening of best performing nanocolloidal candidates and their conversion into customized prototypes ready for commercial uses. All that will only be possible by introducing the key enabling technologies eliminating the unwanted human and laboratory artifacts. This contribution gives a brief overview of current approaches to tackle the aforementioned goals.

In the first part, selected critical parameters will be discussed which control the nanoparticles quality reflected in superconcentrated non-aggregated colloidal state as well as in tunable size range of electronic quantum confinement and thermodynamic melting point depression. The second part of this talk highlights the most progressive key enabling technologies in wet chemical nanomaterials design: (1) WANDA platform (Work station for Automated Nanomaterials Development and Analysis) for differently sized and shaped nanocolloids ; (2) fs-Laser TPA nm/μm/mm-printing platform allows rapid perfectly programmed manufacturing of artificial structure-tuned materials (Metamaterials), which bring many new interesting (and yet unexploited) potential applications, controlled not only by chemical compositions but mainly by the designed architecture per se.

Author did not supply full text of the paper.