

Webinar NanoTBTech

**Nanoparticles synthesis: basic aspects, nucleation-growth strategy, applications to the elaboration of luminescent nanoparticles**

Corinne Chanéac

Chimie de la Matière Condensée de Paris, UMR 7574 CNRS – Sorbonne Université, Paris, France

[corinne.chaneac@sorbonne-universite.fr](mailto:corinne.chaneac@sorbonne-universite.fr)

The fifth edition of the NanoTBTech seminar will be dedicated to the synthesis of nanoparticles and in particular to the development of luminescent nanoparticles for applications in nanothermometry. The presentation will enable an unfamiliar audience to familiarize themselves with the main notions available to chemists to design materials with controlled chemical composition, size and crystal structure in relation to their optical properties.

In the first part, we will speak about the metastability of matter at the nanometric scale, in particular in term of surface energy and its contribution in free enthalpy of solid formation. Then, we will discuss the main steps of the particles formation including classic nucleation-growth mechanism. Special attention will be given to the different strategies for limiting growth either by minimizing the contribution of surface energy or by complexing the surface with ligands. Several examples will be described in order to cover a large variety of nanoparticles, emitting in the visible or near infrared, more or less stable at high temperature. We will focus on the importance of the local structure of the material in the improvement of optical properties. Finally, we will give an example of local temperature measurement by nanothermometers on gold nanorods as nanoheater.