

POLYMERIC NANOPARTICLES: NEW POSSIBILITIES AND CHALLENGES

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Abstract

Heterophase Polymerisation Techniques (HPT) not only create a significant share of industrial wealth, they experience an up to now unbroken renaissance in basic research. This is on the one hand driven by the use of water as a very favourable and environmentally friendly "solvent" or production aid. On the other hand, heterophase polymerisation techniques inherently make use of most actual and fashionable concepts in materials science, such as "structure formation by self-assembly" (e.g. in film formation), "nanotechnology" (given by the inner structure of latexes and their size on the nanoscale), or "nanocomposites and hybrid materials" (addition of inorganic nanostructures into emulsion recipes).

In my opinion, HPTs indeed represent the most feasible and nearby approach of nanotechnology towards new concepts and promises for materials research. I will try to give an overview about recent developments of our group, mainly based on miniemulsion technologies. Points to be covered include:

- the extension of HPTs to other polymer reactions, such as polyaddition, polycondensation, or other polymer reactions.
- the generation of high value polymers in latexes, such as block copolymers and polymeric amphiphiles.
- the generation of colloidal hybrid particles to cross the borderline between polymer latexes and inorganics, dyes and actives.
- the direct encapsulation of both actives and latexes using one-pot procedures
- latex based electronic inks for functional microprinting

Keywords: miniemulsion, polymer latexes, colloidal hybrids, encapsulation