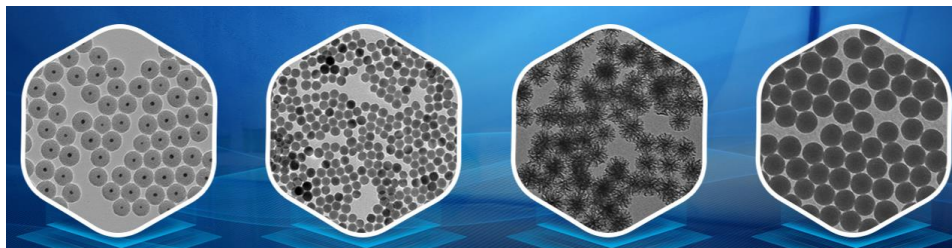


Master Thesis / HIWI

Functional nanoparticles in dispersions: synthesis and applications



Motivation

Functional nanoparticles are widely used in research and real-life applications. The branches include medicine, optics and photonics, energy, quantum technologies, etc. The unique properties of nanoparticles, such as their high surface area and ability to interact with their surroundings, make them valuable tools for a variety of applications. Formulating stable and effective dispersions of these particles is therefore a crucial step in realizing their full potential, especially in the field of inkjet printing. One potential application for nanoparticle dispersions is in inkjet printing. Inkjet printing is a popular method for printing a wide range of materials. However, traditional inkjet inks are limited in their properties and capabilities. The use of nanoparticle dispersions in inkjet inks could allow for the printing of materials with enhanced functionalities and improved performance.

Task

The tasks will focus on potential nanoparticle synthesis, functional nanoparticle dispersion formulations, their characterizations and applications:

- Characterizing the nanoparticles using techniques such as transmission electron microscopy (TEM) and X-ray diffraction (XRD)
- Developing protocols for the preparation of stable and effective nanoparticle dispersions for inkjet printing
- Optimizing the synthesis and dispersion conditions to achieve desired rheological properties and performance
- Collaborating with other team members to integrate nanoparticle dispersions into various inkjet printing applications

Prerequisites

Prerequisite for the work is independent experimental work, team spirit as well as interest in innovations. Masters students in Chemistry, Chemical engineering, Material science, or ones hold synthesis experience are proper candidates for the work. Experience and knowledge of AFM, UV/VIS/NIR spectrometer, SEM, TEM are desired but not necessary.

Research areas

Chemistry,
Chemical
Engineering,
Material science,
or related fields

Type of work

Experimental

Location

LTI
(KIT, Campus South)

Starting date

As soon as possible

Contact person

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