Technische Universität Braunschweig

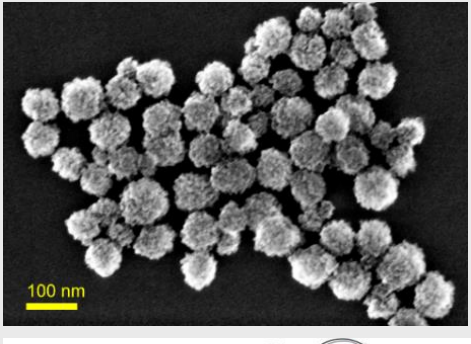
Synthesis and characterization of lanthanide-doped $NaGdF_4$ nanoparticles

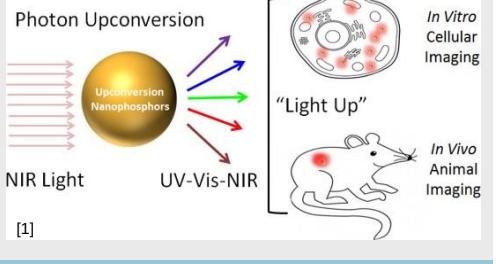
iPAT Institut für Partikeltechnik

Lanthanide-doped $NaGdF_4$ nanoparticles are attractive for the use as fluorophores in the field of medical imaging, solar energy conversion, biological engineering, photodynamic therapy, metrology standards for a high resolution microscopy and cathodoluminescence (CL) analysis.

This work will focus around the *'bottom-up' synthesis* of lanthanide-doped nanoparticles at different sizes as well as their characterization. The advantage of these materials is their *upconversion*, i.e. these particles can emit a short-wave light (visible range) while absorbing a long-wave light (NIR range). **The luminescence colour of nanoparticles and their size** can be controlled by changing the amount of precursors, dopant material and synthesis conditions.

The methods of choice will be absorption and fluorescence spectroscopy, SEM/EDX, TEM, SAXS, DLS, XRD and TGA.





Suitable for all types of theses

by students working on their degree in chemistry, material sciences, engineering, energy or any similar studies with training in laboratory practice. The range of the project can be adjusted to suit your interest and the requirements of each thesis.

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[1] Pu, et.al., *Chinese Journal of Chemical Engineering* **2018,** *26*, 2206-2218