Karlsruher Institut für Technologie

Material Research Center for Energy Systems (MZE)

Master or Bachelor Thesis

"Synthesis of Novel Luminescent Materials" (Prof. Bräse/Prof. Ehrenberg)

Starting date: April 2017 or later

What kind of elements are essential for the most promising luminescent materials? Can we create such of these materials just by reflection about it and because of the energy band gabs of the hosts and the energy levels of the luminescent centers?

In a recently published review article in *Chemical Society Reviews* a lot of the known facts about long persistent luminescent materials are summarized.[1] Long persistent luminophors are defined as very long afterglow materials (in general: seconds to days), that follow a thermally induced luminescent mechanism. Thus, long persistent luminescent materials are different from common fluorescent or phosphorescent substances.

In this project we first want to synthesize literature known near-infrared (NIR) emitting materials and, afterwards, vary in a further step the reaction conditions and change the starting materials to obtain novel materials. Long persistent NIR emitter can be used for a lot of different purposes and in a lot of different application areas. Our focus lies in the fields of medicine and the automobile industry.

Methods for characterization will be i. a. photoluminescent spectroscopy, powder X-ray diffraction, single particle description (size, ζ potential) and electron microscopy techniques (TEM or SEM).

In case you are interested, please contact:
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Literature

[1] Y. Li, M. Geceviciusa, J. Qiu: Long persistent phosphors − from fundamentals to applications, *Chem. Soc. Rev.* **2016**, *45*, 2090−2136.