

# MSE 2024

24 - 26 Sep 2024 (Darmstadt)  
dgm.de

Topic P: Processing and Synthesis

## P05: Molecular Preparative Approaches to Functional Materials

Materials synthesis based on the use of molecular precursors has been recognized as a powerful way to access compounds with controlled and adjustable compositions, crystal structures, morphologies and consequently property profiles. Thus, a careful design of suitable molecular precursors as well as an extensive knowledge about their (thermal) conversion into desired functional materials are of crucial importance for providing improved rational preparative concepts towards tailor-made (multi)functional structures. Molecular synthesis techniques towards functional materials are highly attractive, as they can be performed with highly efficient atom economy, they allow access to well defined chemical and phase compositions as well as to unique morphologies and (metastable) phases. Moreover, they allow for developing and applying dedicated re-cycling / up-cycling technologies which consider waste / scrap as valuable secondary raw materials towards a circular and green(er) economy.

The aim of the symposium is to present concepts for the synthesis of novel multifunctional materials with a tailor-made nanoscaled structure. The focus lies in presenting new concepts and designing matter from atomistic to macroscopic scales through chemical materials technologies. Processing of a large number of materials with controlled crystal structure, porosity and dimensionality involve a significant interplay of process design and chemical parameters, which is rarely considered as a guiding parameter. The present symposium will critically consider various aspects related to the synthesis of functional materials from molecular precursors. Within this context, the precursors chemistry related to gas-phase and solution preparative approaches such as chemical vapor deposition, solvothermal synthesis, sol-gel processing, preceramic polymers-based methods, etc., will be addressed in detail. Moreover, fundamentals related to the conversion of the molecular precursors into (multi)functional materials will be extensively considered. Specific emphasis will be put on the intimate correlation between the molecular architecture of the precursors and the structural features and properties of the resulting functional materials. Moreover, aspects related to novel molecular synthesis strategies, mechanistic elucidation of the conversion of the molecular precursors into improved functional materials as well as to the integration of the resulting materials into structures and devices for various applications such as sensing, energy conversion and storage, theranostics, etc., will also be part of this symposium.

### Symposium Organizer



Dr. Samuel Bernard  
National Center for Scientific Research (CN...



Dr. Emanuel Ionescu  
Technische Universität Darmstadt



Peter Kroll  
UT Arlington



Prof. Dr. Ravi Kumar  
Indian Institute of Technology Madras



Prof. Dr. Sanjay Mathur  
University of Cologne



Dr. Günter Motz  
University of Bayreuth



Prof. Dr. Gurpreet Singh  
Kansas State University

