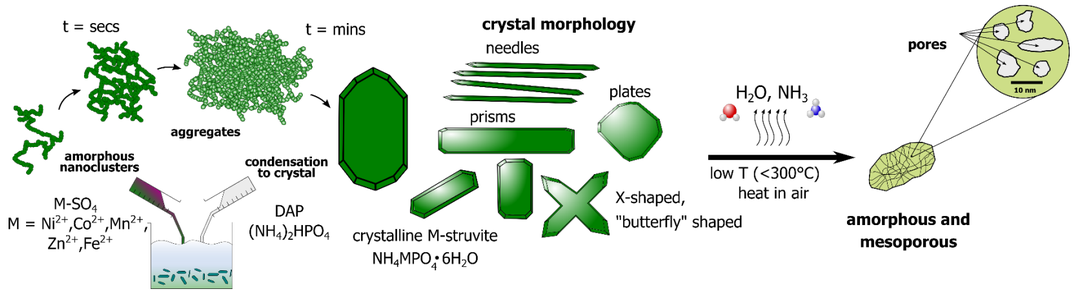
Crystallization and characterization of transition metal phosphates and their mesoporous structures

Stephanos Karafiludis, Ana Guilherme Buzanich, Franziska Emmerling, Tomasz M. Stawski

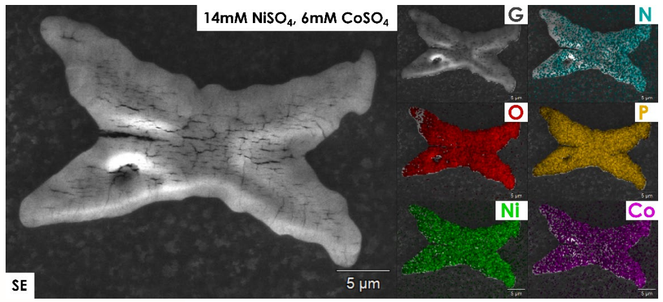
BAM
Bundesanstalt für Materialforschung und -prüfung

Crystallization and nucleation of transition metal phosphates

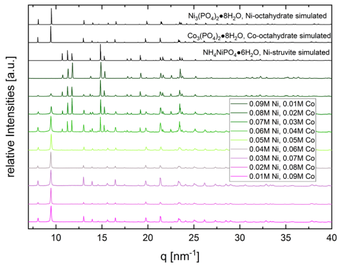
- Precipitation of transition metal phosphates is strongly dependent on reaction physicochemical conditions, which affect nucleation and crystallization of these materials
- Transition metal phosphates are promising materials for applications in electrocatalysis
- Investigation in P-recovery routes out of agricultural and mine waste waters



SEM images and EDX mapping



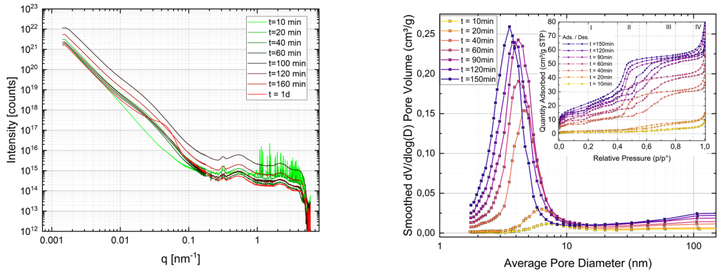
Phase composition by XRD



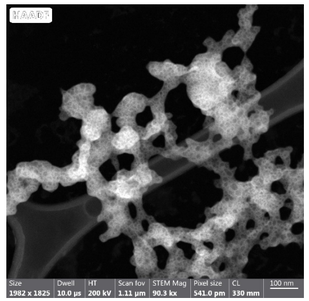
Evolution of mesoporous structures

- Through thermal treatment at low T (< 300°C) we observe an evolution of pores (2-50 nm) with simultaneous amorphization
- Mesoporous materials exhibit higher catalytical activity due to more active metal sites and higher internal surface

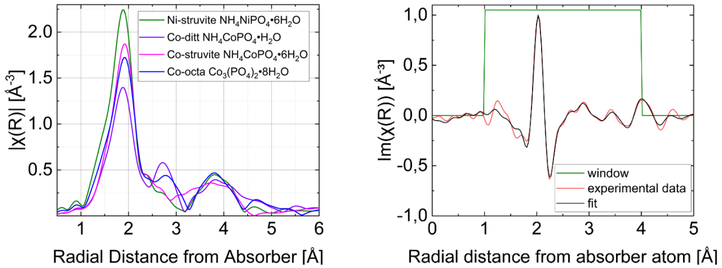
Characterization of mesoporosity by SAXS/WAXS and BET



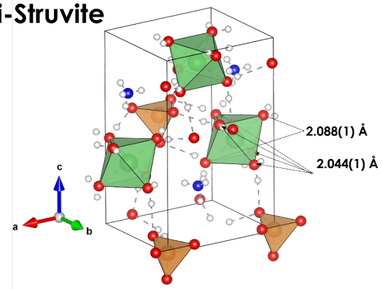
Pore structure visible by TEM



Coordination environment by EXAFS



Ni-Struvite



Sicherheit in Technik und Chemie