

ICB PhD public presentations

IN SITU STUDIES ON THE CRYSTALLIZATION OF AMORPHOUS CALCIUM CARBONATE AND THE ROLE OF MAGNESIUM IONS IN CALCIUM CARBONATE POLYMORPH SELECTION

Jacinta Xto

The van Bokhoven Group

Supervisor: Prof. Dr. Jeroen Anton van Bokhoven

Co-examiner: Prof. Dr. Christoph Müller and

Dr. Thomas Huthwelker



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Project Summary: Playing a critical role in the global carbon dioxide cycle, in the regulation of aquatic chemistry and in a variety of industrial applications, calcium carbonate is an extensively studied mineral. However, due to its multistep crystallization pathway and its multiple crystalline polymorphs post nucleation processes are still intriguing to researchers. This work focuses on demystifying these processes by exploring factors that influence the crystallization of amorphous calcium carbonate (ACC) in air and the role of magnesium ions in calcium carbonate polymorph selection. Through in situ X-ray absorption spectroscopy, we reveal that the stability of ACC in air/humidity is influenced by deliquescent salt impurities, such as sodium chloride, which catalyse the crystallization process. In the presence of magnesium ions, our findings further show that the precise control of saturation levels is key in controlling polymorph selection in the Ca-Mg-CO₃ system. The findings give insights that potentially benefit future design of calcium carbonate synthesis protocols ideal for industry and biomimetic synthesis.

CV: Jacinta received her B.Sc. in analytical chemistry from Jomo Kenyatta University Kenya and her double M.Sc. in chemistry from University Paris-Sud 11 France and Adam Mickiewicz University Poland. In 2015, she joined the group of Prof. Jeroen van Bokhoven for her PhD.