

The Birth and Life Cycle of a Nanoparticle: or how to make crystals from ions

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The reactions that control the nucleation, growth and crystallization of phases from solution usually follow a series of complex and often multi-stage reactions that are often difficult to assess. Novel sample preparation / handling approaches, new in situ and time resolved and high-resolution methods permit such reactions to be quantified at more realistic chemical and physical conditions. I will discuss how we used these developments to follow complex phase formation pathways at high temporal and spatial resolution and how in various geochemical systems the reactions from ions through poorly ordered or nanocrystalline phases and ultimately to stable crystalline phases proceed. I will also discuss what we can learn from such reactions that would improve our understanding of natural or industrial processes.