

GETTING THE JOB DONE: HOW DO ORGANIC MOLECULES CONTROL MINERALIZATION?

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In the idealized laboratory environment mineral formation from pure solutions follows either a single or a multistep nucleation pathway. The latter case involves the formation, aggregation and transformation of precursor particles to the final crystals [e.g. 1-3]. But, in most real-world crystallization environments organic molecules play a key role and are, for example, a central part of biomineralization.

To gain full understanding/control of crystallization, the interaction between the precursors particles, intermediate and final phases needs to be precisely unraveled. In order to elucidate how organic molecules “get the job done” we have extensively studied *in situ* and at the macro- and nanoscale the early stages of mineral formation in the presence of organic molecules. These results are compared to the pathway observed previously for the additive free system.

An overview of our latest results on mineral formation mediated by organic molecules will be presented. Special emphasis will be placed on the interaction of organic molecules with precursor particles and how this affects the dynamics of the nucleation pathway and its implications for (bio)mineralization processes.

[1] De Yoreo et al., *Science* 349, 489, 2015.

[2] Van Driessche et al., *New perspectives on mineral nucleation and growth*. Springer-Verlag, 2017.

[3] Krautwurst et al., *Chem. Mater.* 30, 9, 2018.