

Teaching (macromolecular) crystallization with movies

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The aim of a crystallization lecture is to provide biocrystallographers, who intend to tackle protein-crystallization, with theory and practical examples.

We introduce the fundamental phenomena in protein crystallization: supersaturation, nucleation, growth and transformation of crystals. Moreover, from a physical point of view proteins serve as macromolecular model systems because biological macromolecules and small organic or mineral molecules follow the same rules, that is to say crystal growth mechanisms are the same.[1]

Based on data obtained using in-situ investigation of crystallization[2], we illustrate physico-chemical properties of crystallization with movies: How supersaturation is achieved? How do nucleation, growth, polymorphism, demixion and kinetic ripening proceed? We show that these movies are perfect tools to teach crystal growth. Thus in our lecture, we give concrete examples illustrating protein crystallization.[3]

1. Chernov A.A. , *Journal of Materials Science: Materials in Electronics*, 12 (2001) 437-449.
2. Astier J. P., Veessler S., *Cryst. Growth Des.*, 8 (2008) 4215-4219.
3. Candoni N., Grossier R., Hammadi Z., Morin R., Veessler S., *Protein & Peptide Letters*, 19 (2012) 714-724.