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Change of Fractal Dimension during the early stages of Lysozyme Crystallization

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In this study we focussed on the question of how to grow crystals as large as possible in light of their use as samples for neutron protein crystallography. We investigated the early stages of the crystallisation process where the directions are set between the growth of many small crystals or few large ones. We used lysozyme since it is considered as a model system for crystal growth. Small angle neutron scattering was used in combination with static light scattering in order to realize an extended q-range. In situ dynamic light scattering at the neutron scattering sample cell was used to obtain an overview of all sizes present in the crystallisation process. We could observe a fractal growth of the crystal seeds with a change in the fractal dimension from 1.0 to 1.7 in the first 90 min. This can be interpreted that at first a branched crystal seed is formed which grows more in a linearly. Later, the space between the arms is filled to cross over to a more densely packed fractal.

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