

MS34 Crystallization Techniques and chemical reactions driven by solid state interactions

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Heterogeneous nucleation of protein crystals

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Abstract

The inducement of crystal nucleation on foreign substrates, usually called heterogeneous nucleation, is a long-established technique for the optimisation of protein crystals. It allows not only the improvement of protein crystals by allowing them to grow under supersaturations lower than those required for spontaneous nucleation, but also the discovery of new conditions during initial screening. Indeed, it has been found that many screen conditions, although suitable for crystal growth, provide insufficient supersaturation for nucleation, thus going undetected in the absence of a heterogeneous nucleant.

Scores of possible substrates have been tested as heterogeneous nucleants, but those that yield good results for a reasonably wide range of proteins are scarce. Furthermore, using such nucleants requires a good grasp of how and over what range of conditions they are expected to function, and often some dexterity. They are therefore often overlooked and underused. A range of heterogeneous nucleants, designed and tested by our team¹⁻⁵ and by others, will be surveyed and the rationale of their function will be explained in a more theoretical way. Some examples of their successful use in our hands will also be given.

References

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