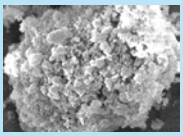
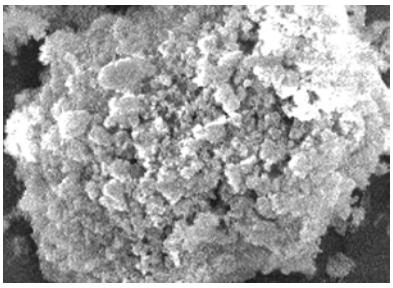


...intelligent solutions for protein crystallization

Naomi's Nucleants™

Towards a 'universal' nucleant for protein crystallization

Naomi's Nucleants have facilitated the crystallization of 14 proteins, the highest number reported for any single nucleant. Many of these proteins have proven difficult to crystallize and some of these, including membrane proteins, have only been crystallized in the presence of Naomi's Nucleants.



Naomi's Nucleants are made from bio-glass material (CaO-P_2O_5-SiO_2) and has a highly porous surface with cavities of similar sizes to proteins. It is hypothesised that the cavities entrap protein molecules, thereby encouraging nucleation and crystal formation.

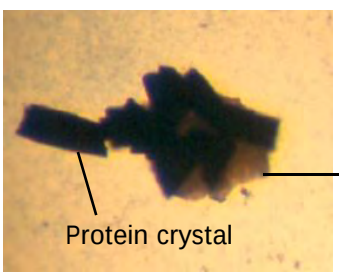
Surface texture of Naomi's Nucleant. Scanning electron micrograph showing the highly porous nature of this material.

".. the most effective nucleant of any material tested."
Imperial College, London, UK.

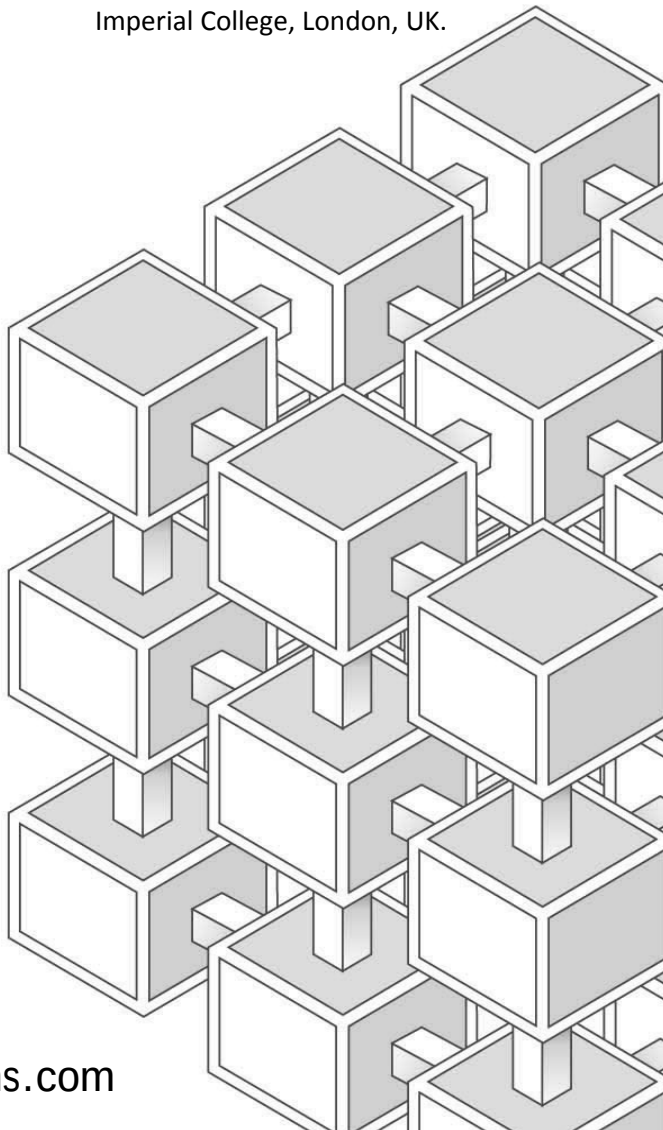
Examples of proteins crystallized in the presence of Naomi's nucleants are:

A multi drug resistance protein (a membrane protein),
modified cyclodextrine,
oxyntomodulin,
myosin binding protein C,
lobster shell á-crustacyanin,
c-phycocyanin,
á-actinin actin binding protein.

Often the crystals obtained were of increased diffracting quality compared to those resulting from standard techniques. For example, myosin binding protein C diffracted to 1.6Å compared to 3Å (without nucleants).



Crystals of lobster shell á-crustacyanin grown on a grain of Naomi's Nucleant.



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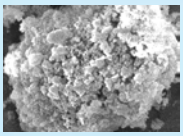


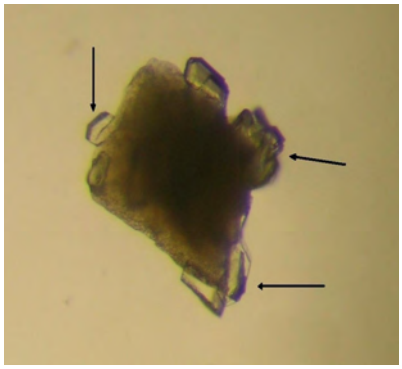
...intelligent solutions for protein crystallization

Naomi's Nucleants™

Towards a 'universal' nucleant for protein crystallization

Method of use:

- Simply add a single grain* to a crystallization drop.
  Easy to place with fine tweezers or a MicroProbe, or use a drop of precipitant on a MicroProbe or pipette tip.
- Use in screening to nucleate in metastable conditions (these would normally produce clear drops).
- Effective over a range of pH conditions.
- Use in optimization where excessive nucleation occurs (i.e. lots of tiny crystals).
  Back off the precipitant concentration to the metastable zone and then use a grain to nucleate.
- Negates twinning.
- Protein crystals are easily detached from the nucleant using a MicroProbe or a LithoLoop™.



Crystals (arrowed) of â-lactamase grown on a grain of Naomi's Nucleant by Rosalida Leone at imperial College, London.

Ordering Information

Naomi's Nucleants	1 vial* (~300 grains)	MD2-07
Fine tweezers	1 pair	MD9-25
MicroProbe Kit	Set of 30	MD9-01

*** Please note:** There is a wide variety of grain sizes in each vial. Every grain is useable as a nucleant – even the very small ones (which are still much larger than a protein molecule!).

References:

Chayen, N.E., Saridakis, E. and Sear R. Experiment and theory for heterogeneous nucleation of protein crystals in a porous medium. PNAS (2006) 103, 597-601.

Saridakis, E. and Chayen N.E., Towards a 'universal' nucleant for protein crystallization. Trends in Biotechnology (2009) 27,