

## Promotion of Solute Nucleation by Alternation of the Mass-to-charge Ratio of a Levitated Droplet

This invention concerns the nucleation of dissolved solids from solution. We have observed that the energy barrier for dissolved solids to nucleate is affected by the mass-to-charge ratio of the nucleation volume; a reduction in the mass-to-charge ratio of the nucleation medium causes the barrier for nucleation to decrease. This observation, which has been demonstrated for several inorganic salts and small organic compounds, suggests that nucleation media that have appropriate mass-to-charge ratios can be used to promote the formation of nuclei.

We anticipate that this solute-induced nucleation phenomenon in a vessel where the mass-to-charge ratio is within a certain range is likely to be general for all dissolved solids, ranging from inorganic compounds to low- and high-molecular-weight organic compounds, including proteins. This technology can be readily automated for incorporation into a crystallization process.

### Applications

- Promotion of solute nucleation;
- Preparation of nuclei of proteins that can be grown into crystals that can be subsequently characterized by X-ray crystallography for structure determination;
- Co-crystallization of compound mixtures (i.e. peptides with an organic chromophore for use in matrix assisted laser desorption (MALDI));
- Co-crystallization of small compounds with proteins (i.e. protein structure/function and applicability to drug discovery).

### Stage of Development

Experiments to prove/disprove this hypothesis are underway. This invention could have a major impact on crystallization technology and methodology. One possible application could be to provide snapshots, crystals, of protein-substrate interactions.

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### Intellectual Property Status

U.S. Provisional Patent application filed February 9, 2004.

### Partnering Opportunity

Research and development collaboration or direct licensing of the technology.

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<sup>4</sup> PR Newswire Association LLC, "Difficult vein location," (New Device Solves Problem), [online] 2002, <http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/06-26-2002/0001754083&EDATE=>

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