

Advancements in Automated Imaging

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Formulatrix

The unambiguous and reliable identification of biological crystals remains a major obstacle in crystallography particularly in the critical stage of initial screening experiments. Automated imaging at high-resolution in the VIS range is often insufficient to identify all conditions that have or may result in crystals. The use of UV light and fluorescence imaging adds an additional tool in that process. One possibility to overcome the shortcomings of intrinsic fluorescence, which critically depends of the amount of naturally occurring Trp, is Trace Label Fluorescence (TLF). A new protocol allows easy and rapid labelling of 0.1% of samples with a variety of fluorescent dyes immediately prior to crystallization. In addition to a significantly enhanced signal to noise ratio over intrinsic fluorescence, multiple labelling can be used to verify the presence of multi-subunit complexes in the crystal. We introduce a new device which enables users to quickly change between the required excitation wavelengths for their preferred dye or combination of dyes.

Second Order Non-linear Imaging of Chiral Crystals (SONICC) provides unprecedented resolution and contrast in the identification of chiral crystals entirely independent of any background material like soluble or precipitated sample or plastic ware. Microcrystalline material which is often the only lead in initial screening experiments can positively be identified. The method relies on the use of a femto-second laser at 1064nm wavelength and the rapid scanning of crystallization droplets to prevent sample damage. We have integrated that technology with our Rock Imager line of imagers to further enhance the repertoire of tools for the unambiguous identification of crystals in crystallography.

Both methods and their technical realizations will be introduced together with examples from the field to demonstrate their range of application and benefits.