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2-D Polymer-Based Device for Serial X-Ray Crystallography

Tech ID: 32452 / UC Case 2021-673-0

ABSTRACT

Researchers at the University of California, Davis have developed a single-use chip for the identification of protein crystals using X-ray based instruments.

FULL DESCRIPTION

X-ray crystallography has allowed researchers to determine high-resolution protein crystals. However, previous delivery of micro-crystal samples has been a challenge due to the delivery methods used. There are mainly two delivery methods used: liquid jets or fixed targets. Devices that utilize liquid jets have low hit rates, need large protein samples, and are not compatible with a variety of crystallography methods. A fixed target, polymer-based delivery method has been developed for both synchrotron and XFEL sources.

Researchers at the University of California Davis have developed a microfluidic, polymer-based chip for serial protein crystallography. This allows for improved in-situ X-ray diffraction protein characterization and signal detection in order to minimize the protein sample needed. The design offers a variety of features, such as the crystallography of much smaller crystals, thinner support films, and the ability to minimize signal noise. It can also be used with laboratory scale, 2nd and 3rd generation X-ray sources, and potentially XFELs.

APPLICATIONS

- ▶ Quickly identifies protein crystals using X-ray based instruments
- ▶ Enables various in-situ protein crystallization strategies that optimizes X-ray signal resolution

FEATURES/BENEFITS

- ▶ Single-use disposable, easy to load and handle
- ▶ Low cost and background noise
- ▶ Maintains full hydration and long-term stability of sample
- ▶ Flexible design for optimization based on X-ray beam line characteristics and crystal dimensions (micron to mm)
- ▶ Amenable to surface functionalization for selective protein crystal growth and binding
- ▶ Can be used with a wider variety of X-ray sources for crystallography

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230417689	12/28/2023	2021-673

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OTHER INFORMATION

KEYWORDS

X-ray, crystallography, protein characterization, delivery methods, chip device

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