

Development of a Flip-Type Fixed-Target Sample Holder for Synchrotron Serial Crystallography

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Synchrotron serial crystallography (SSX) enables room-temperature structure determination of proteins using synchrotron radiation. However, challenges remain, including high sample consumption, removal of mother liquor, efficient ligand soaking, and prevention of crystal dehydration. To address these issues, we developed a novel flip-type fixed-target sample holder, compatible with conventional protein crystallography beamlines, using nylon mesh and Kapton film. The holder's performance was validated with lysozyme crystals at room temperature. A total of ~19,600 diffraction images were collected over 40 minutes at a 10 Hz repetition rate on the 11C beamline at Pohang Accelerator Laboratory (PAL), yielding a lysozyme structure at 1.89 Å resolution. This simple and effective flip-holder offers a practical solution for routine SSX experiments at synchrotron facilities.

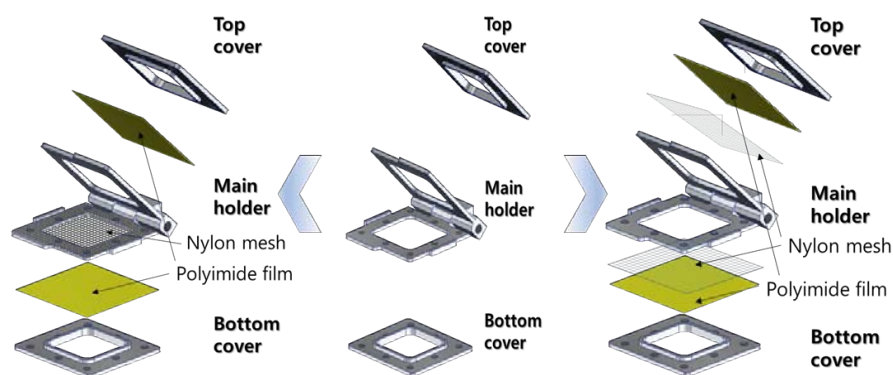


Figure 1. Two assembly scheme illustrations of the sample holder. One nylon mesh is placed inside the main holder and the kapton films (left). Two nylon meshes and kapton films are placed outside the main holder (right)

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