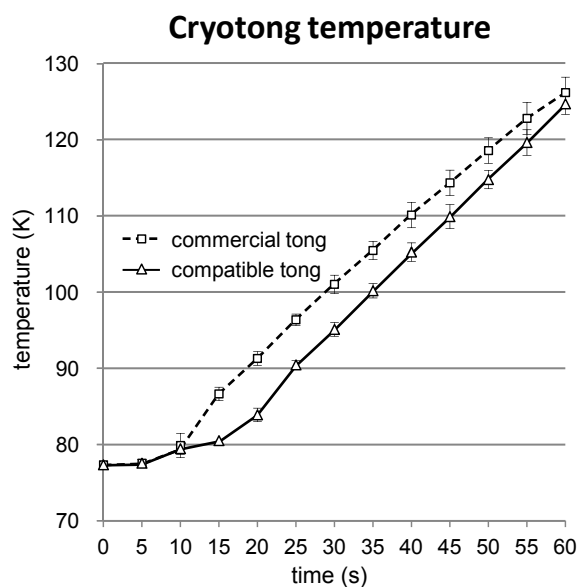


**Figure S1**

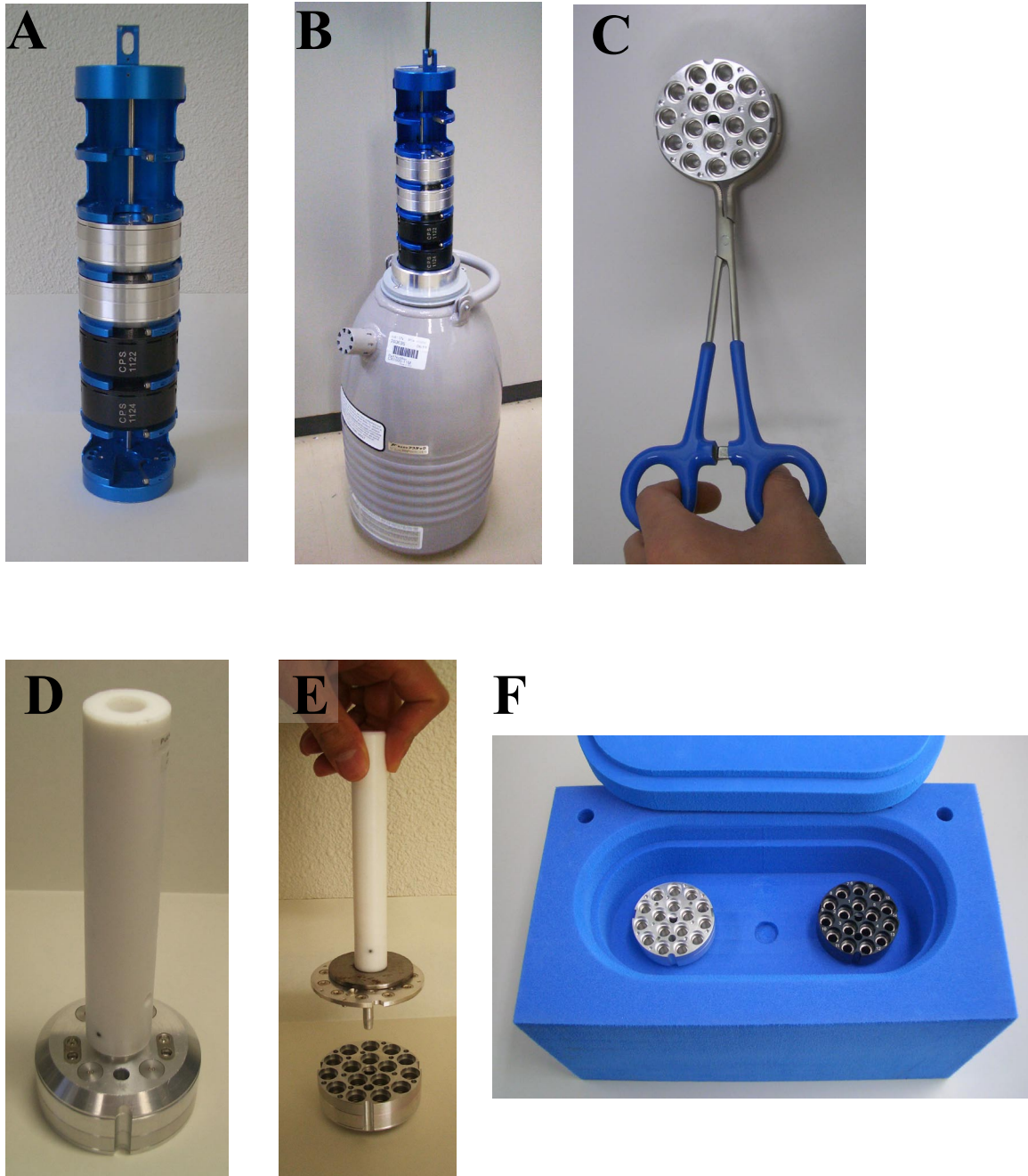
Cryo-tongs for compatible pins (A) and general pins (B). The pin-holding cavities are enlarged in the left panels. (C) Modification of a commercial cryotong (left) to accommodate compatible pins (right). The area indicated by the red dotted lines are removed. Unit of the numbers is mm. (D) A cryowand with a compatible pin.



**Figure S2**

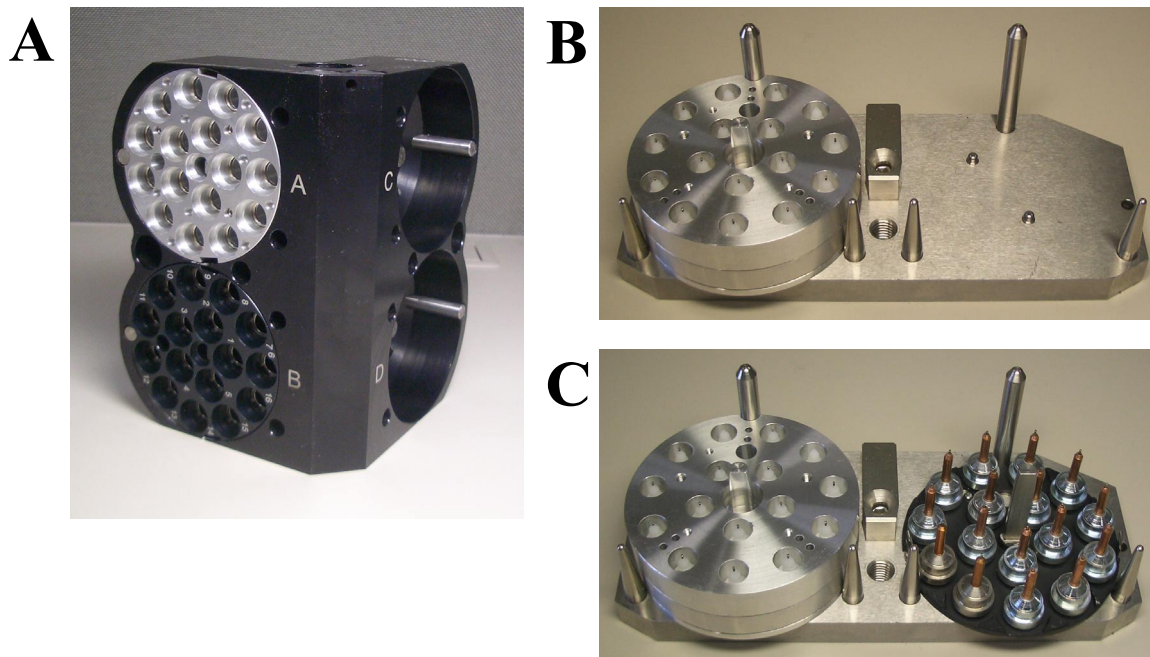
A chart showing temperature variations inside the cavities of compatible (open triangle, solid line) and of commercial (open square, dashed line) cryo-tongs. Test pins were pre-cooled with corresponding tongs in liquid nitrogen and the temperature measurements were started immediately after removing the cryo-tongs from the liquid nitrogen. The measurements were performed five times and the standard deviations are shown in error bars.

The temperature was measured using a thermocouple (Anritsu Meter Co., Ltd.) attached to the test pins through the holes additionally drilled. A crystalcap copper magnetic (18 mm; Hampton Research Corp.) pin is used as a representative general pin.



**Figure S3**

Compatibility of the compatible cassette with Uni-puck. (A) Compatible cassettes (silver) and Uni-pucks (black) stored in a commercial Shelved Puck Shipping Cane. (B) (A) with a commercial dryshipper. (C) A compatible cassette with commercial Bent Cryotongs. The Bent Cryotongs were originally designed for Uni-puck. (D) A commercial Puck Dewar Loading Tool attached to a compatible cassette. (E) Opening the bottom cover of the compatible cassette using a commercial Puck Wand. (F) A compatible cassette (left) and a Uni-puck (right) in a commercial Puck Loading Dewar.



#### Figure S4

(A) A compatible cassette and a Uni-puck stored in a Uni-puck adaptor for PAM. (B) A compatible cassette on an adaptor plate of SPACE for Uni-puck. The top cover of the cassette is removed. This setting is equivalent with that for the cassette in liquid nitrogen Dewar of SPACE. (C) A compatible cassette (left) and a Uni-puck (right) on the adaptor plate of SPACE. These settings are also equivalent with those of the cassettes in a SPACE Dewar.

## A Direct Freezing



Mounting a crystal on a compatible pin



Dipping the crystal in liquid nitrogen and store it in the compatible cassette

## B Flash Freezing



Harvesting a flash-frozen crystal with modified cryo-tongs



Temporary store the crystal in a cryovial



Transfer the crystal from the cryovial into the compatible cassette

### Figure S5

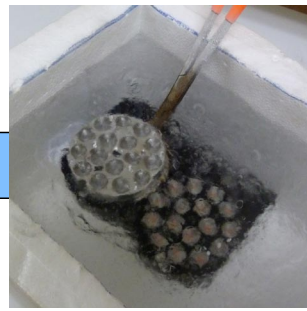
Two methods for loading a compatible cassette with crystals. (A) Direct freezing. A crystal is picked up by a compatible pin attached to a commercial cryowand (left). The crystal is frozen in liquid nitrogen and stored in a compatible cassette (right). (B) Flash freezing. A crystal mounted on a compatible pin is frozen in a nitrogen stream around 100 K. The frozen crystal is picked up with pre-cooled cryo-tongs (left). The compatible pin may be temporarily stored in a commercial cryovial (center). The crystal is then transferred to a compatible cassette (right).



## A PAM at Photon Factory



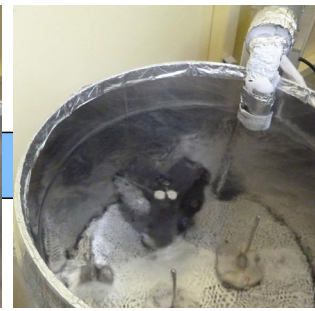
Unscrewing and removing the bottom cover



Insertion of the cassette into a Uni-puck adaptor



Setting the Uni-puck adaptor



Ready for crystal operations by PAM

## B SPACE at SPring-8



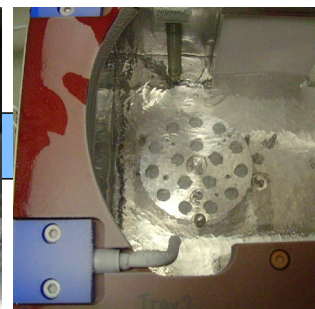
Loading a cassette in the liquid nitrogen Dewar



Loosening hex screws



Removing the top cover



Ready for crystal operations by SPACE

### Figure S6

(A) Preparation for the compatible cassette in a beamline in which PAM is installed. The two screws of the bottom cover are loosened to remove the cover from the cassette in liquid nitrogen (first panel). The cassette is set in a Uni-puck adaptor for PAM using Bent Cryotongs (second panel). The Uni-puck adaptor is set in the PAM Dewar (third panel). The crystals in the cassette are ready for mounting on the beamline goniometer (fourth panel). (B) Preparation for a compatible cassette in a beamline in which SPACE is installed. The compatible cassette is mounted on the SPACE liquid nitrogen Dewar using a commercial Puck Dewar Loading Tool (first panel). The two hex screws on the top cover are loosened with a standard hexagonal wrench (second panel). The top cover is removed (third panel) and ready for mounting the crystals on the beamline goniometer (fourth panel).