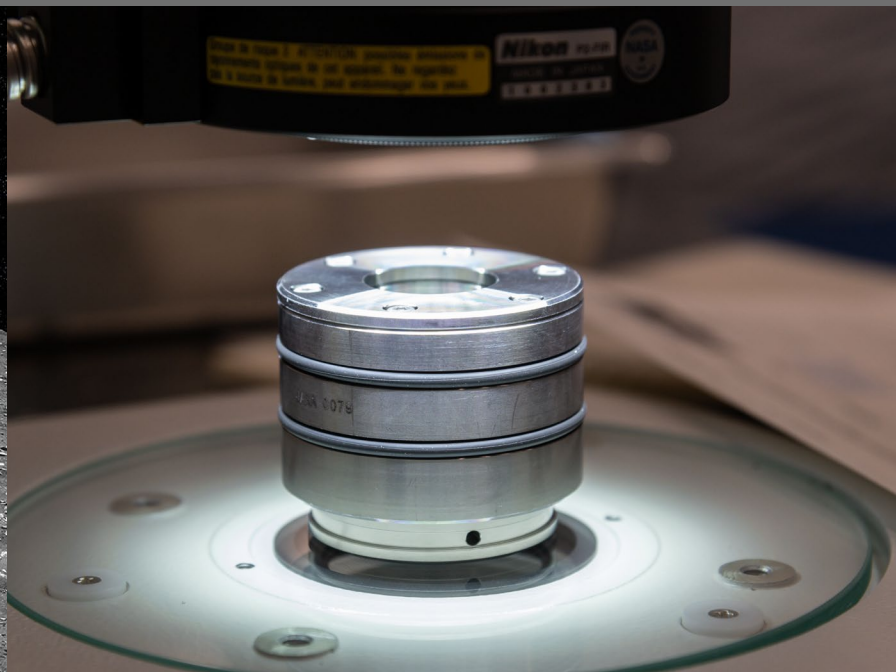
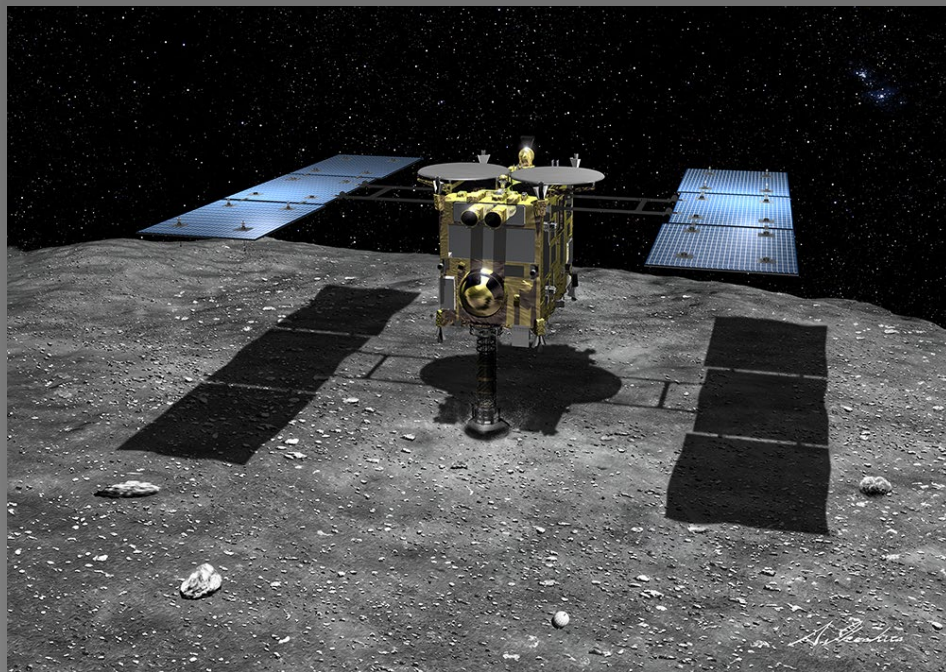
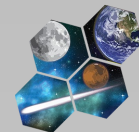




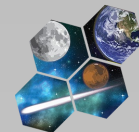
Hayabusa2 Collection Update

ExMAG Spring 2024



Christopher Snead
NASA Hayabusa2 Sample Curator

Hayabusa2 Samples are Available for Allocation



- 28 Facility-to-Facility Transfer Containers (FFTCs) delivered
- 24 individual “stones”
- Four aggregate sample containers
- 500 mg total mass
- One sample request received, no allocations so far

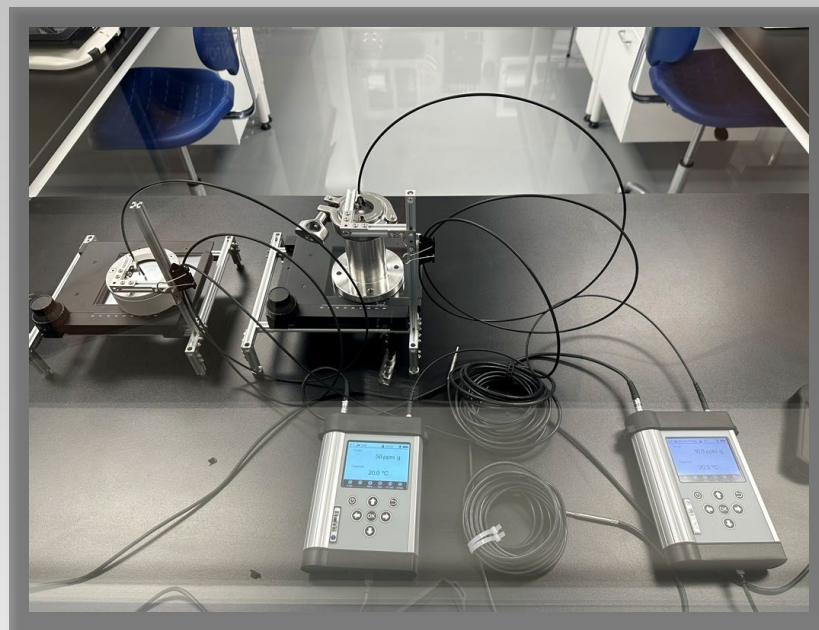
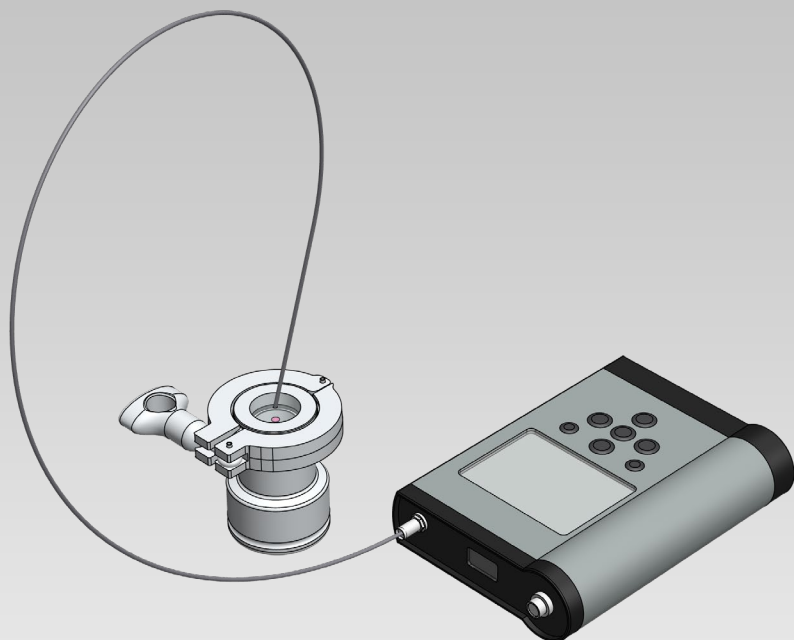


The screenshot shows the 'CURATION Hayabusa2' website. The top navigation bar includes links for 'SAMPLE COLLECTIONS', 'SAMPLE REQUEST DEADLINES', 'CURATION NEWS', 'ASTROMATERIALS NEWSLETTER', 'EDUCATION SAMPLES', and 'NASA/ARES'. Below this is a secondary navigation bar with 'LUNAR', 'METEORITE', 'STARDUST', 'GENESIS', 'COSMIC DUST', 'MICROPARTICLE IMPACTS', 'HAYABUSA', and 'HAYABUSA2'. The main content area is titled 'AVAILABLE HAYABUSA2 SAMPLES' and displays a grid of 15 sample images, each labeled with an ID: A0005, A0007, A0013, A0015, A0038, A0044, A0061, A0091, A0095, A0096, A0216, and A0217. On the left side of the website, there is a sidebar with links: 'SAMPLE REQUESTS', 'OUR COLLECTION', 'HAYABUSA2 SAMPLE INFORMATION', 'ABOUT THE HAYABUSA2 MISSION', and 'Hayabusa2 Curation Contacts'. At the bottom, there is an 'External Links' section with a link to 'JAXA Hayabusa2 Curation'.

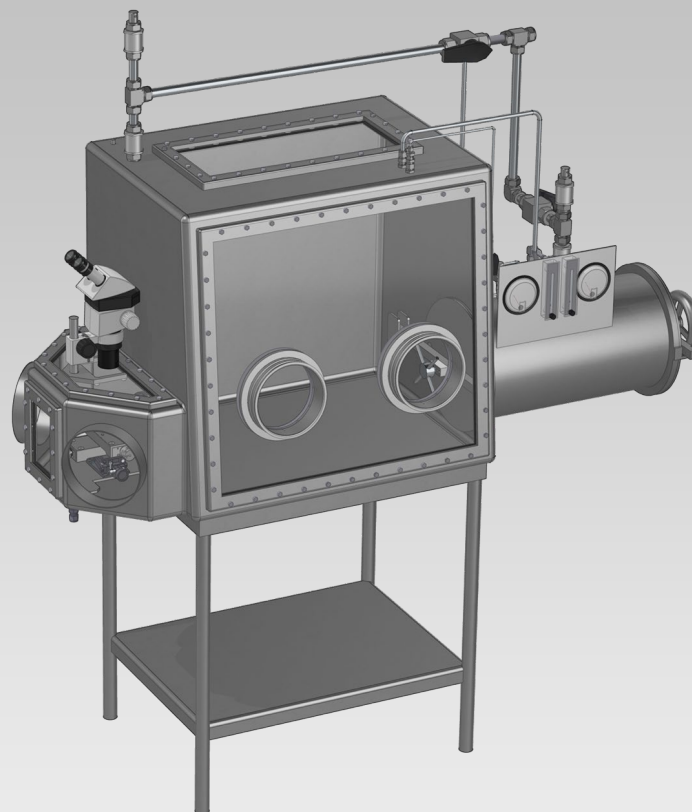
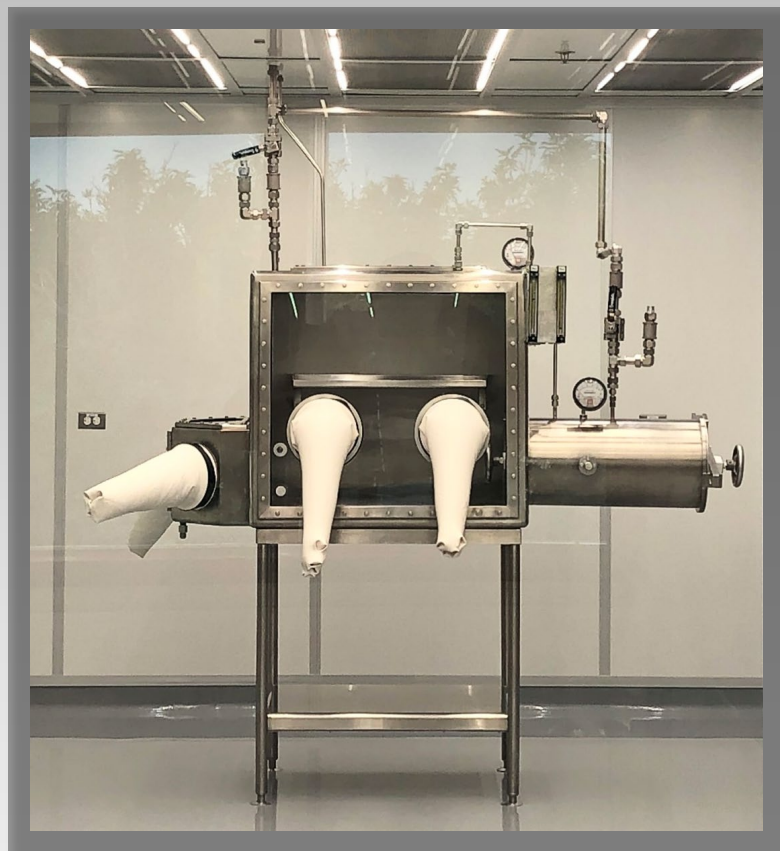
<https://curator.jsc.nasa.gov/hayabusa2/>

- OSIRIS-REx samples arrived in September 2023
- Sample processors, curators, curation engineering team effort focused on laboratory and equipment preparation for OREx arrival for bulk of past year
- With successful disassembly of OSIRIS-REx TAGSAM, efforts resumed to prepare Hayabusa2 laboratory for sample processing
- Focus on subdividing aggregate samples, developing tools and equipment for small particle manipulation



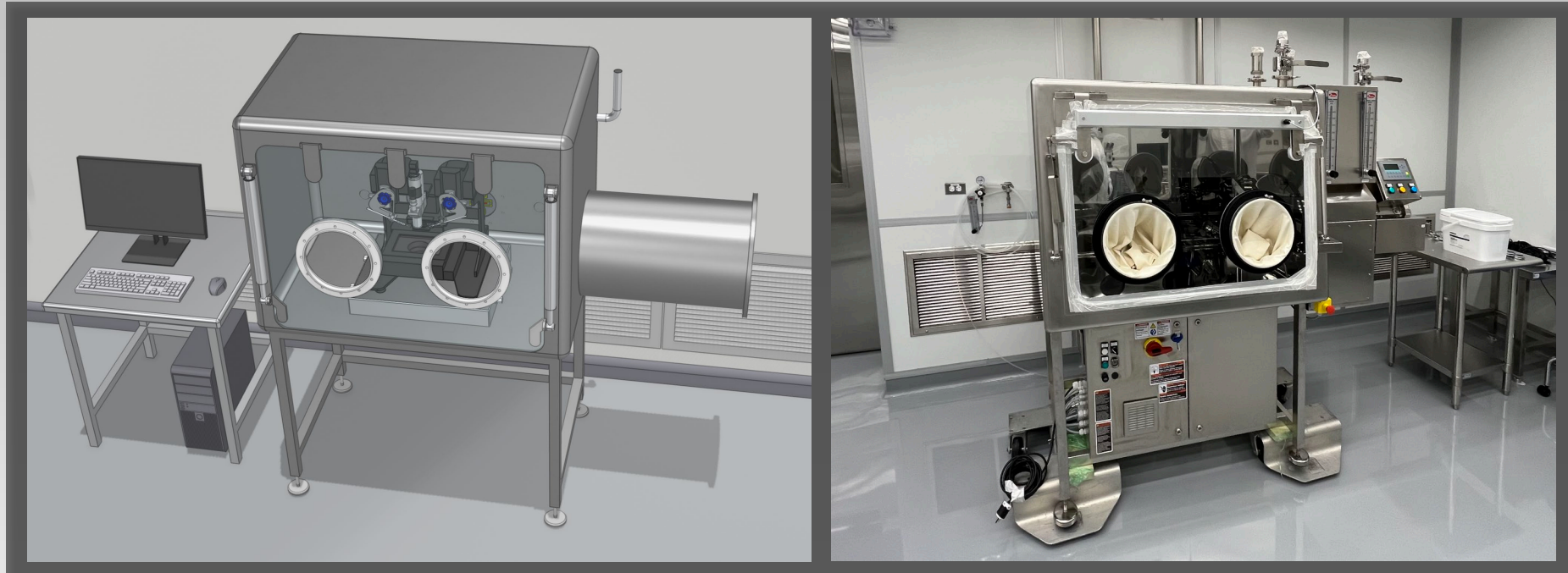


- **Optochemical Sensor testing of candidate sample containers reported at LPSC 2024**
- **Sensor spots allow testing of internal nitrogen environment without modifying container housings**
- **Testing can occur through transparent materials**



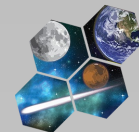
- LED lighting has been added to main processing chamber
- Internal O₂ environment has been measured via optochemical sensor – 18 ppm O₂ at nominal processing conditions
- Internal airlock door mechanism currently being altered to prevent particle shedding
- Limited processing/subdivision can be performed in current interim glovebox (e.g. no activities requiring multiple processors)

Micromanipulator Glovebox

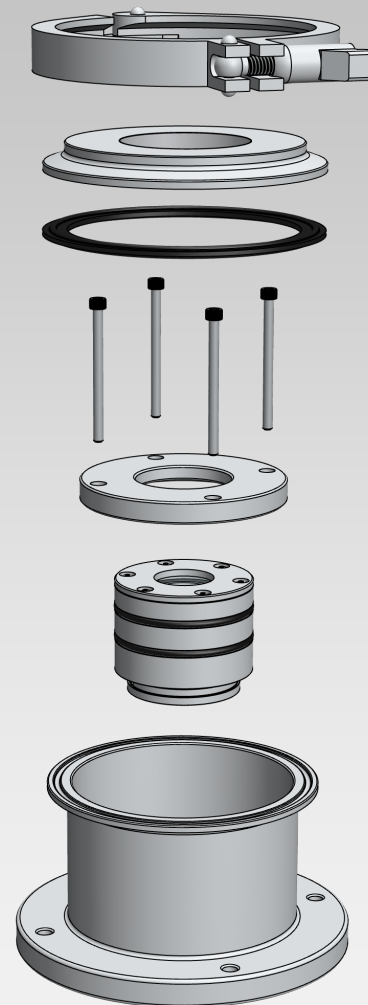


- Micromanipulator glovebox has been delivered, cleaned and installed in Hayabusa2 lab
- Electrical work and setup by manufacturer currently underway (May 2024)
- Will be used to manipulate very small ($<100\mu\text{m}$) Ryugu grains in anoxic conditions
- MicroSupport AxisPro system to be installed and tested in glovebox prior to use (Balazs, etc. for contamination knowledge)

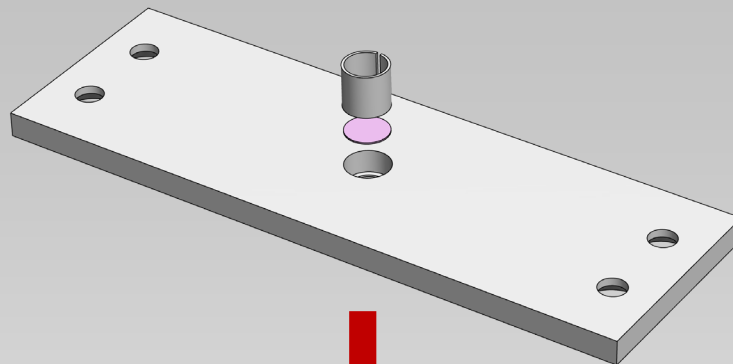
Secondary containment of Facility-To-Facility Transfer Containers (FFTCs)



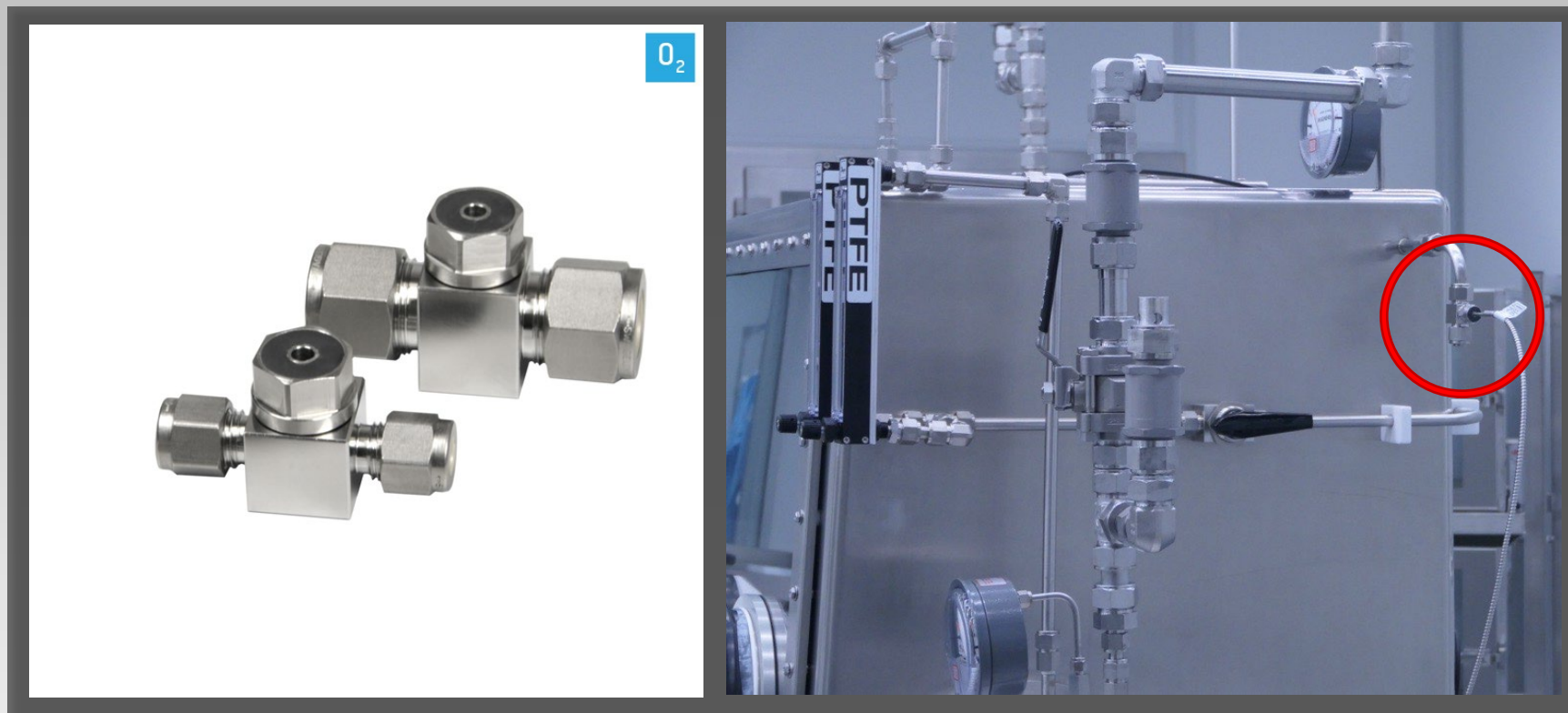
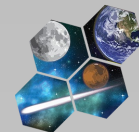
- In preparation for potential interruptions in continuous nitrogen flow due to infrastructure projects, storms, etc., we have been developing secondary containers for the Hayabusa2 samples that are currently stored in Facility-To-Facility Transfer Containers (FFTCs)
- Containers will consist of 4" tri-clamp containers that were initially designed for OSIRIS-REx witness coupons
- These containers have been tested via optochemical sensors and prevent ingress of O₂ for ~10 days
- Secondary container design will still allow visual inspection of sealed Ryugu samples



- We have constructed an aluminum mounting frame that enables the deployment of an optochemical sensor in an environment without the use of adhesive
- Sensor spot is constructed of a material that is not included in our curation list of approved materials; as such, it cannot be placed in environments that contain samples
- We are beginning to assess the internal N_2 environments of various desiccators (such as the unit that currently contains the Hayabusa2 samples)
- We will also attempt to assess the environments of our newer isolating desiccator (which is currently being cleaned and prepared for installation in the Hayabusa2 lab).



Flow Through O₂ sensors Purchased for Glovebox and Desiccator Monitoring



- We have recently acquired sensors integrated into a metal flow-through cell; these can be mounted easily on desiccator and glovebox exhausts (including airlock exhausts)
- Installed on Hayabusa2 processing glovebox; configuration trapped gas and gave incorrect oxygen concentrations – sensors must be mounted in-line with exhaust