

Hot Environments Lab: A New Lab for Venus Experimental Investigations



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Goal

The Hot Environments Lab will support planetary research by providing verifiable laboratory data that will serve to validate and test planetary observations and models. The research conducted will maximize the scientific return of missions and observations of hot environments and will directly support the DAVINCI mission to Venus.

Current Equipment & Capabilities

Venus Simulation Chambers

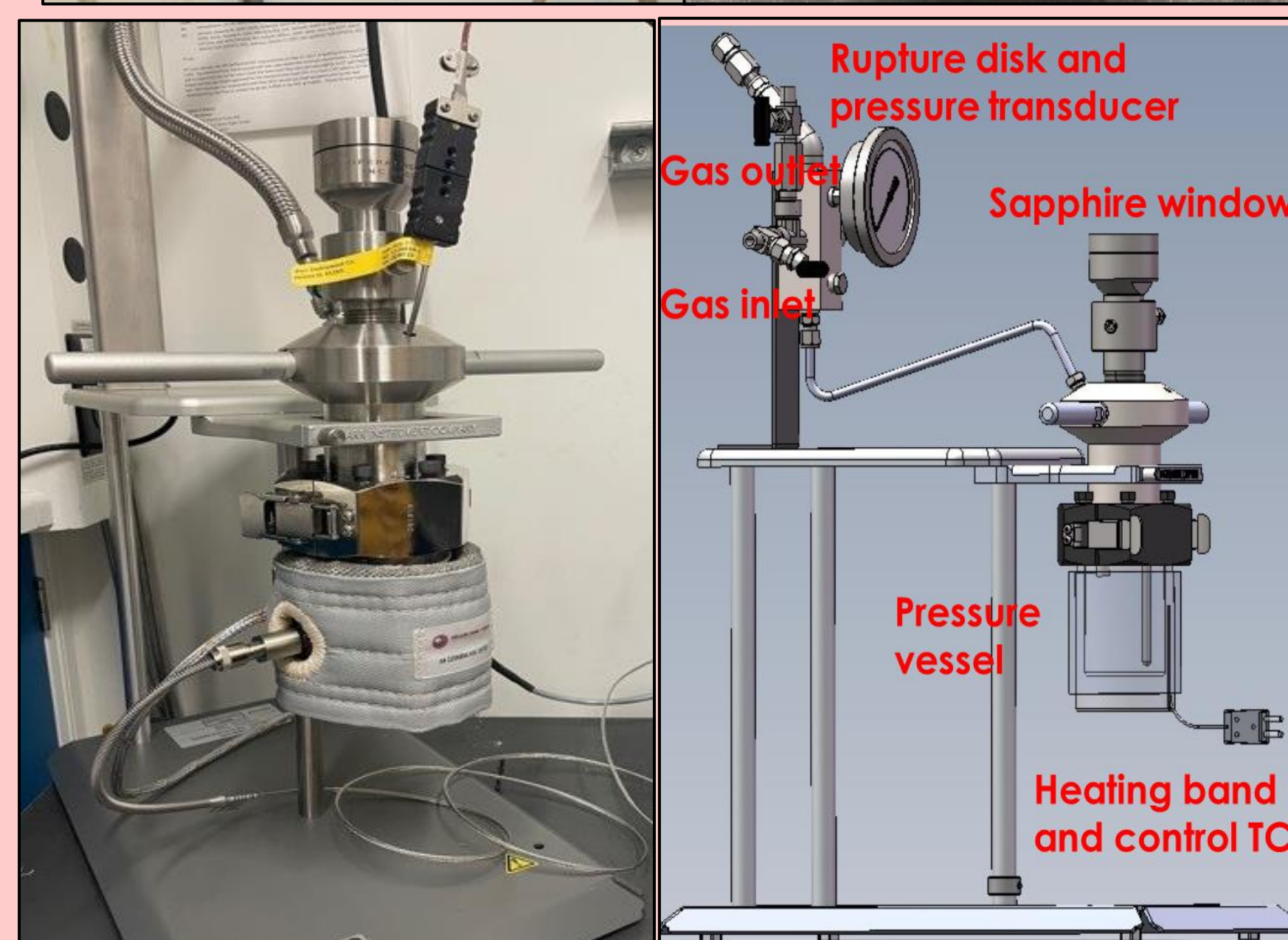
Venus In-situ Chamber Investigations (VICI)

- 5 in diam x 11 in depth
- 316 Stainless steel
- Pressure: vacuum to 96 bar
- Temperature: ambient to 470°C
- Gas species: CO₂, N₂, SO₂
- Feedthroughs; larger – ideal for instruments
- LabVIEW software records simultaneous temperature and pressure readings



Small Venus chamber

- 300 mL
- Alloy 600 (Inconel)
- Temperature: ambient to 490°C
- Pressure: vacuum to 105 bar
- Gases: CO₂, N₂, SO₂, CO, etc.
- Optional optical window, smaller – quick turnaround time
- Two chambers allow for simultaneous experiments

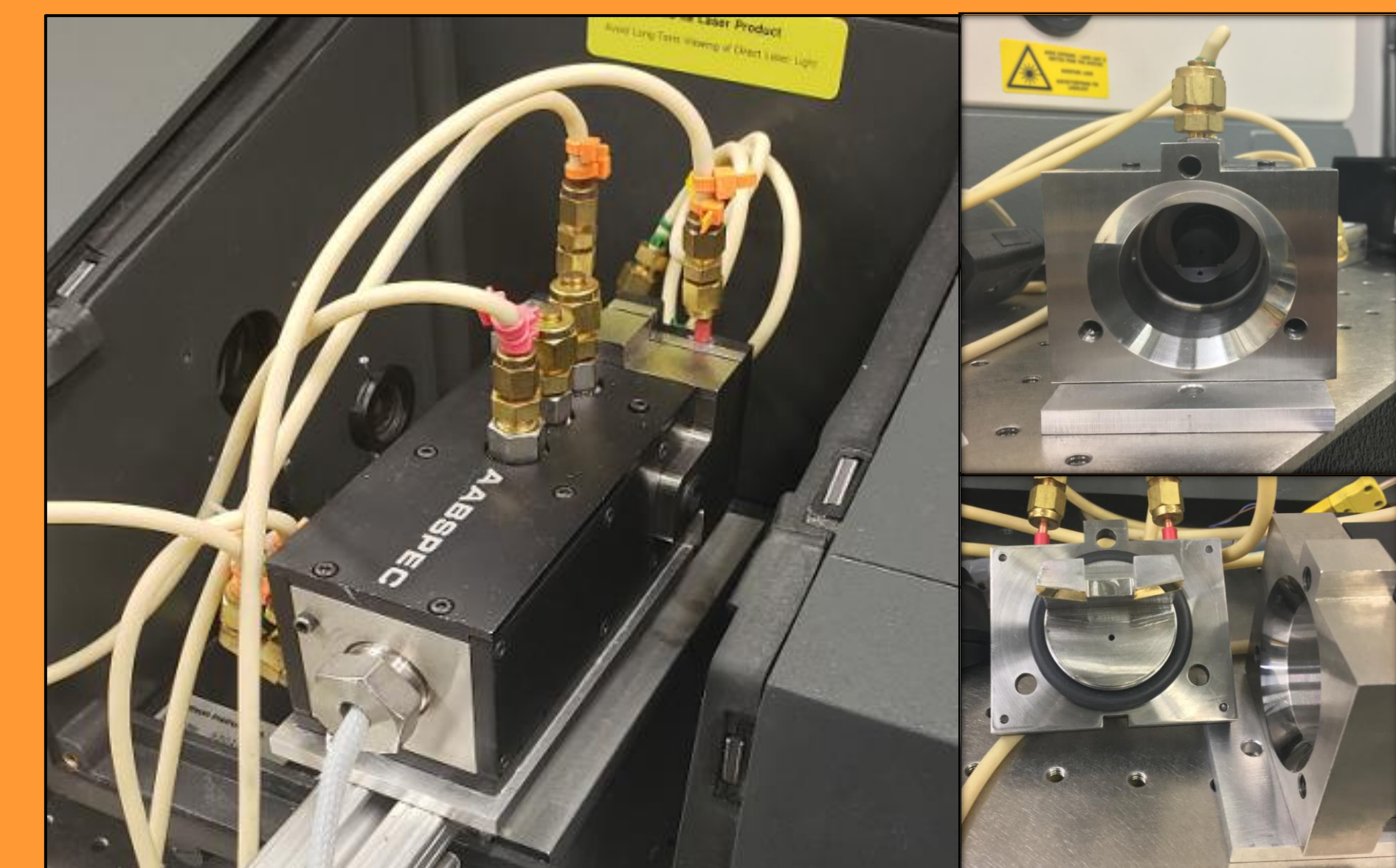


Spectroscopy

Two FTIRs covering VIS-FIR spectroscopy range, and multivariable FTIR cells:

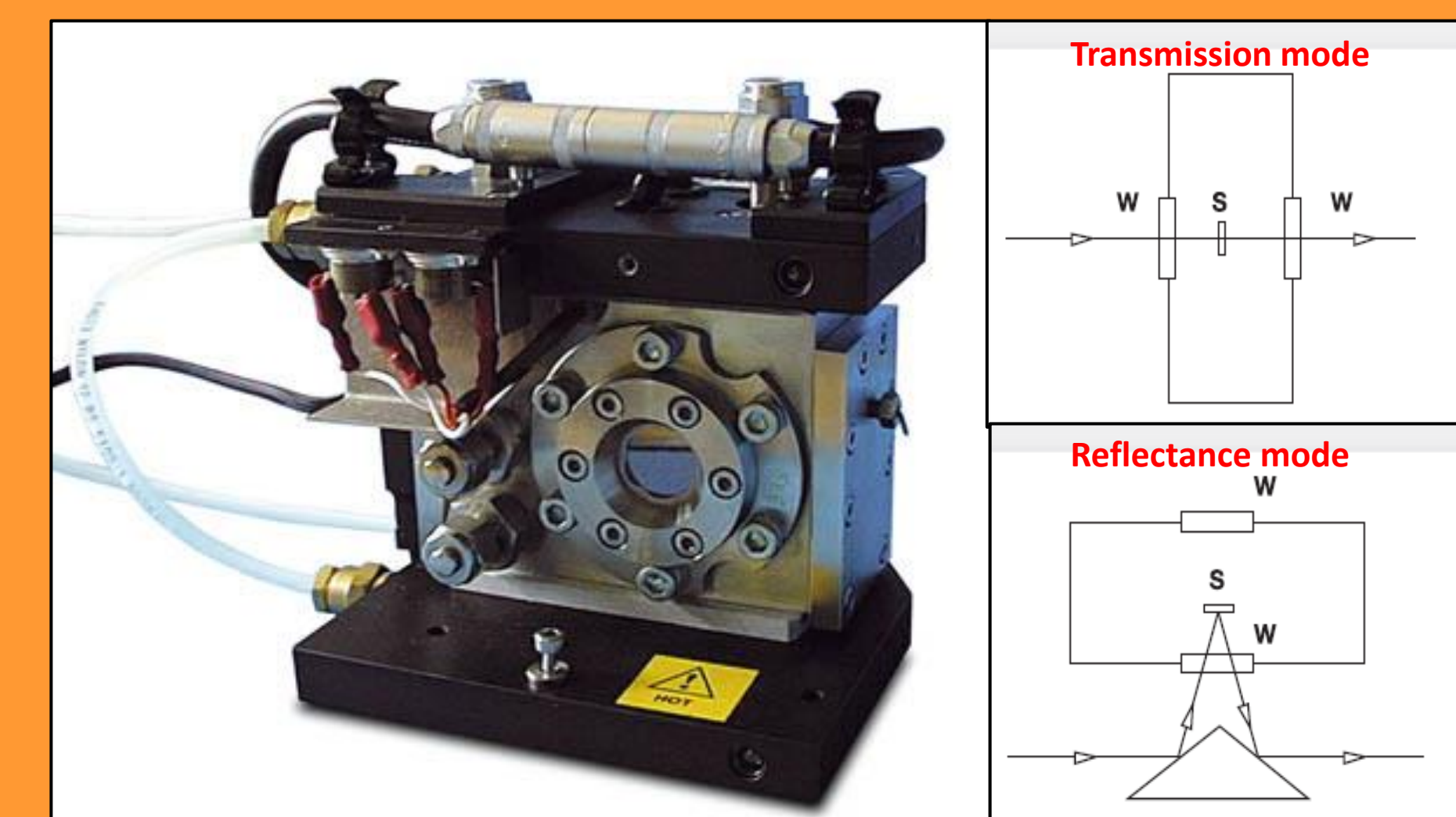
Aabspec Cell

- Variable temperature and pressure cell for IR spectroscopy
- Temperature: -170°C to 950°C
- Pressure: vacuum to 138 bar
- Gases: CO₂, N₂, SO₂, CO, etc.
- Ideal for mid-IR, solids and gases



Specac Cell

- Variable temperature and pressure cell for IR spectroscopy
- Temperature: ambient - 800°C
- Pressure: vacuum to 69 bar
- Gases: CO₂, N₂, SO₂, CO, etc.
- Ideal for NIR, solids, liquids, and gases

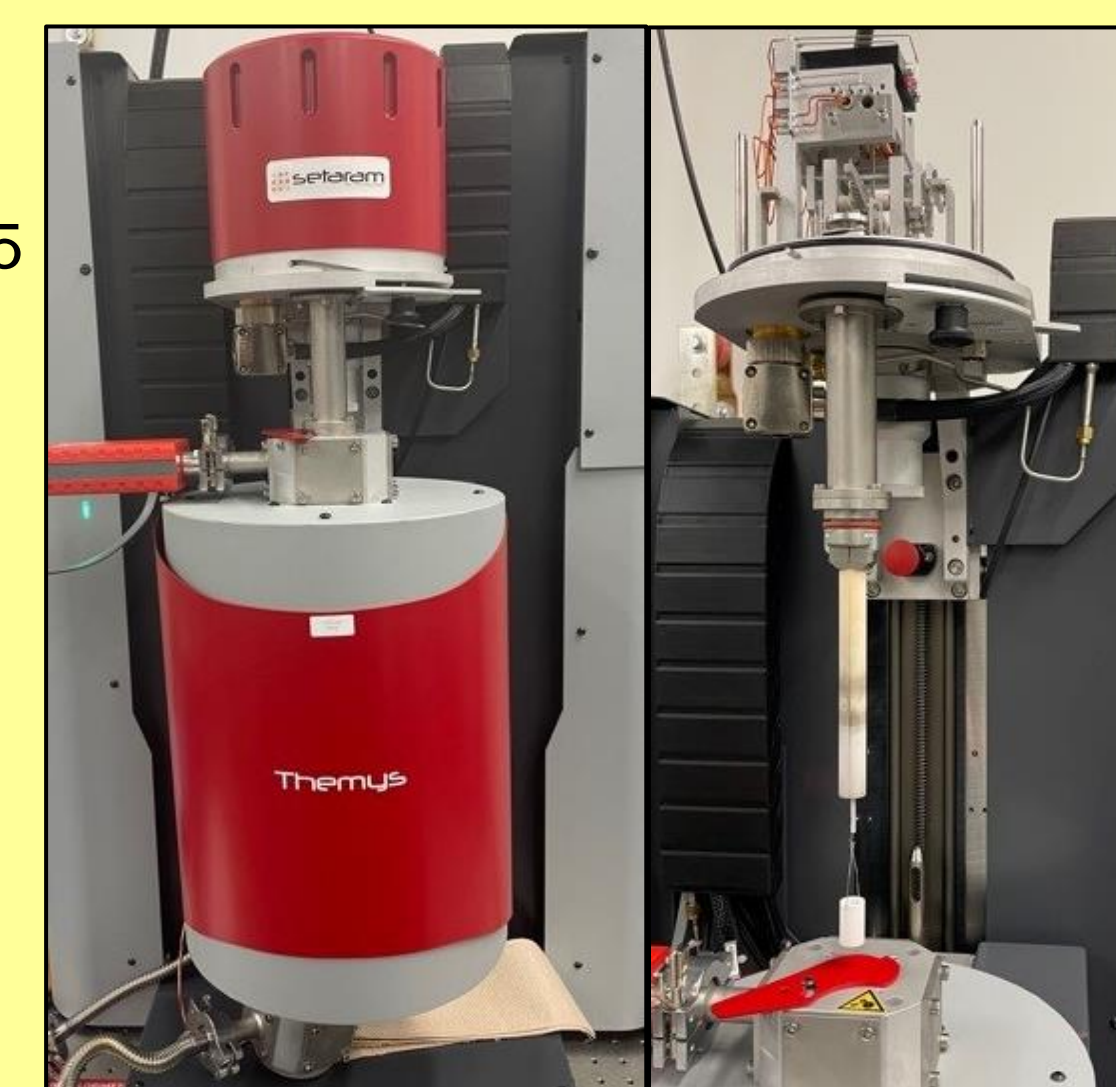


Thermogravimetric Systems

- Samples are loaded in an alumina Knudsen cell, and suspended in an alumina reactor tube
- Molybdenum disilicide heating units
- Pressure range: 10⁻³ to 10⁻⁵ Pa
- Temperature range: ≤1800°C
- Measures mass loss as a function of temperature



- Graphite heating units
- Pressure range: 10⁻³ to 10⁻⁵ Pa
- Temperature range: ≤2300°C under vacuum
- Has DSC and DTA capabilities, and is connected to an FTIR for evolved gas analysis



Contact Information

We are looking for lab members!

In order to obtain time, please contact Erika Kohler by phone: 301-614-5756 or email: Erika.kohler@nasa.gov