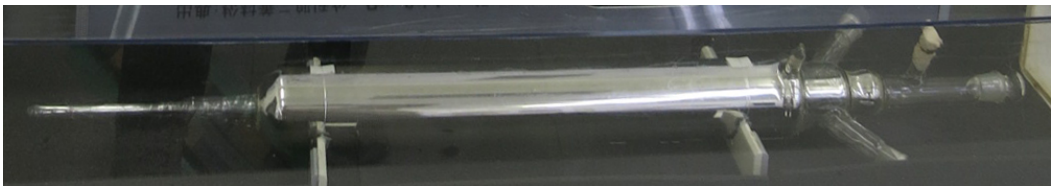
14 A liq.^{4}He / liq.N_2 cryostat Dewer by double-duplex glass tubing (since 1973)

History of the development of lab-use glass equipment in Tohoku University can be going back in the same year as of the campus start. Together with the nurturing program of glass blow specialist and thanks in the collaboration with researchers, a lot of unique glass apparatus was made in the campus.

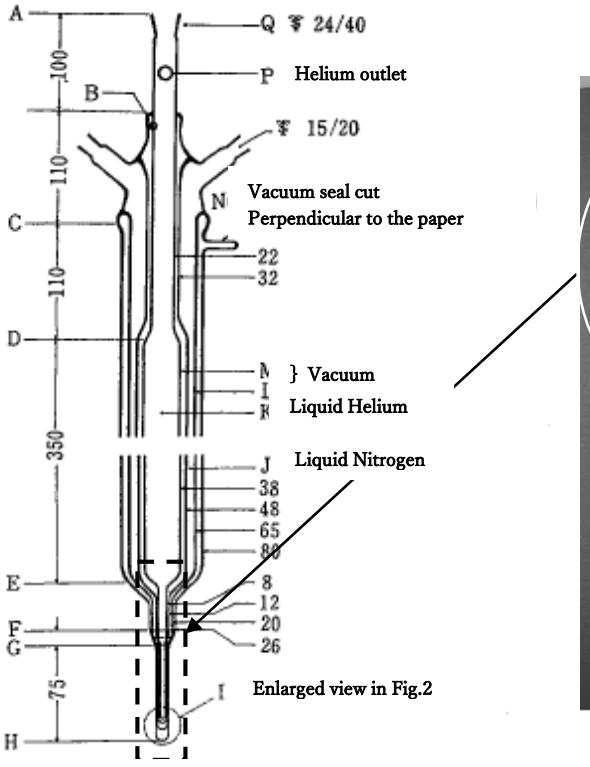
A liq.^{4}He / liq. N_2 cryostat, integrated as a single Dewer, was developed at Chemical Research Institute of Non-Aqueous Solutions, Tohoku University (later Institute of Multidisciplinary Research for Advanced Materials, Tohoku University) and tailored to specific research needs. Key to realize the cryostat Dewer lies in knowhow about Quartz/ Pylex glass blow joint tubing thinned to about 0.6mm thick. Multi-stage Quartz / Pyrex glass joint enabled the production of various type of glass cryostats, which were applied to low-temperature experiments such as infrared and UV-visible absorption spectroscopy, ESR spectroscopy, and AC magnetic susceptibility measurements.

The helium Dewar on display was crafted around 1984 by Zenjiro Matsumura for X-band ESR. It consists of four Quartz / Pyrex blown joint glass tubes, located in the reduced diameter region of the cylindrical body. There innermost quartz tube, served as liq. ^{4}He reservoir in the X-band cavity, has a small 5 mm diameter, which reduce helium consumption and assures a long measurements time.

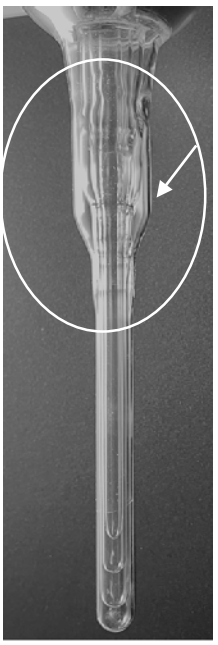


Double-duplex glass tube Helium cryostat Dewar Designed for long time measurement with minimal liquid Helium consumption

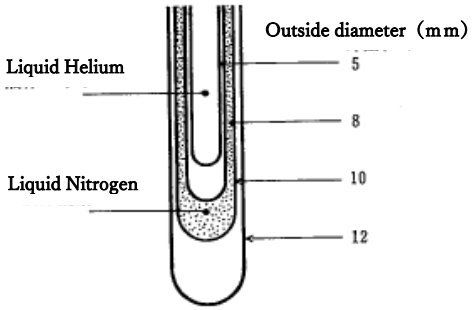
cons



Insert-Type Liquid Helium Cryostat. All dimensions are in mm; glass tube diameters refer to outer dimensions."



Each quartz/Pyrex glass joint sections are set by glass blow with vertical offset. Both the cavity quartz wall and vacuum gap are ~0.5 mm thick, ensuring a compact structure.



Quartz quadruple tube insertion section

The quartz tube is polished to thin, then the glass is joined.

Ref.; Matsumura et al, Rev. Sci. Inst., 45, 596 (1976)