

Development of 1.5W Cryostat for a Cold Trap Application

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A laboratory cryostat for analysis of gas isotopes was developed based on industrialized version of SRI475 cryocooler. At room temperature and 77K, SRI475 cryocooler has cooling power of about 1.5W. This cryocooler was selected as a compact solution with a lot of cooling power was needed. A need for cooling power was significant because there was a substantial thermal mass to be cooled during a cool-down as the cryostat has a removable cold trap mounted on a cold tip. The cryostat uses active vacuum to reduce convective losses. Interface between the cold tip and the cold trap was made of nickel-plated OFHC copper. Because it is a very soft material, additional threaded parts were brazed on it for mounting of the cold trap. To compensate for possible displacement of the cold tip because of mounting forces and moments, internal clearance of a displacer piston towards a cold finger wall had to be increased. Nevertheless, after integration of the cryocooler with the cold trap measurements showed very good results with performance of the cryostat within expected range.