
SESSION 2: JT & Sorption Coolers

Paper 2.4

Tuesday ORAL Session

11:30 AM

Closed Cycle Mixed-Refrigerant Joule-Thomson Cryocooler for Laboratory Applications

N. Tzabar, CryoR - Cryogenics Research, Lavon, Israel

Joule-Thomson (JT) cryocooler performances are determined by the refrigerant properties, the recuperative heat exchanger efficiency, operating pressures, and the refrigerant's flow rate. JT cryocoolers benefit from the option of a simple replacement of cold-heads. Recently, CryoR Ltd delivered its first JT cryocooler for laboratory use. The cryocooler includes a compressor unit and a cold head, which are connected by long and flexible connecting tubes. The compressor unit consists of a commercial oil-lubricated refrigeration compressor, and it is suitable for driving various cold-heads at different cooling temperatures. The cold-head design can be modified to comply with the system-to-be-cooled demands, while allowing the basic cooling requirements (cold temperature and cooling power). Finally, mixed refrigerants are determined to provide the required cooling performance and to comply with other restrictions, mainly flammability and environmental restrictions. Replacing the mixed refrigerant is possible by a simple procedure that is executed on-site. Consequently, the cryocooler is suitable for various applications in the lab, it enables us to cool different experimental setups at various operating conditions. The existing mixed refrigerants are suitable for cooling temperatures between 70 and 200 K, where each mixture's cooling temperature can be adjusted during operation in about ten degrees, by controlling the operating pressures.