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DESIGN, DEVELOPMENT AND STUDIES ON A LIQUID NITROGEN BASED CRYOSORPTION PUMP

Content :

Cryosorption pumps are the vacuum pumping method for many high and ultra-high vacuum applications due to their reliability, cleanliness, and high pumping speeds. They are used in several industrial applications such as Semiconductor, Optical Coating, Particle Accelerators, Medical devices etc. and in Research and Development. These pumps generally use activated carbon as the sorbent material for pumping of various gases. Such a pump can be either cryocooler based or cryogenic fluid based. Supercritical liquid helium cooled cryosorption pumps are used in fusion tokamaks for pumping of helium and hydrogen. In our efforts towards the development of cryosorption pumps, we have designed, fabricated and studied cryosorption pumps cooled with liquid nitrogen (LN₂). Specially developed activated carbon cloth are adhesively bonded on the surface of copper panels (7 numbers) and mounted inside a vacuum chamber. This chamber when cooled with LN₂ forms the cryopump operating at 77 K. In this work, we report the performances of these pumps such as the ultimate vacuum, pumping speeds for different gases such as argon and nitrogen.

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