



Contribution ID: 255

Type: **Poster Presentation**

## **Pumping speed studies of activated carbons at 4.2 K adhered to indigenously developed hydroformed cryopanel**

*Monday, June 29, 2015 2:00 PM (2 hours)*

For the fabrication of a cryopump with large pumping speeds for use in tokamaks, in particular, for gases such as helium and hydrogen, different activated carbon sorbents (with surface areas  $\sim 2000$  m<sup>2</sup>/g) in the form of granules, spheres and cloths have been developed. These sorbents are adhesively bonded on a small size hydroformed (in-house developed technology) cryopanel of size  $\sim 500$ mm x 100 mm, and this constituted a Small Scale Cryopump Facility (SSCF). The pumping speeds of this SSCF for various gases have been measured as per AVS standards which comprises of a dome mounted with pressure gauges, calibrated leak valve and gas analyser. The SSCF cryopanel was shielded by LN<sub>2</sub> cooled radiation shields and chevron baffles to minimize the heat in leak. The measured average pumping speeds for SSCF with the surface area of  $\sim 1000$  cm<sup>2</sup> for He and H<sub>2</sub> at the constant panel temperature of 4.5 K, in the pressure range of 10<sup>-7</sup> to 10<sup>-4</sup> mbar, are  $\sim 2500$  l/s and 2700 l/s respectively. The Pump performances for SSCF were also studied by using the test particle Monte Carlo simulation in Molflow+. The pumping speeds for different gases were analysed by varying the sticking coefficient and compared with the experimental results to find the sticking coefficients for helium and hydrogen. This paper describes the characterization and performances of different activated carbons, details of the SSCF experimental setup and the experimental results, the Monte Carlo simulation results and their comparison towards realizing the large scale cryopump.

**Primary author:** Ms GANGRADEY, Ranjana (Institute for Plasma Research, India)

**Co-authors:** Mr RANA, Chirag (Institute for Plasma Research, India); Mr PATEL, Haresh (Institute for Plasma Research, India); Mrs AGARWAL, Jyoti (Institute for Plasma Research, India); Dr MISHRA, Jyoti Shankar (Institute for Plasma Research, India); Mr PANCHAL, Paresh (Institute for Plasma Research, India); Mr BAIRAGI, Pawan (Institute for Plasma Research, India); Mr NAYAK, Pratik (Institute for Plasma Research, India); Mr MUKHERJEE, Samiran (Institute for Plasma Research, India); Prof. KASTHURIRENGAN, Srinivasan (Institute for Plasma Research, India); Mr LAMBADE, Vrushabh (Institute for Plasma Research, India)

**Presenter:** Ms GANGRADEY, Ranjana (Institute for Plasma Research, India)

**Session Classification:** C1PoG - Thermal Analysis and Design

**Track Classification:** CEC-02 - Large-Scale Systems, Facilities, and Testing