

## Study of electron stimulated desorption of hydrogen physisorbed on a rare gas solids and cold copper surface

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Study of hydrogen is a growing interest in vacuum technology to reach extreme high vacuum (XHV). Hydrogen outgassing is the most important factor to obtain vacuum pressure below  $1 \times 10^{-10}$  Pa. We are investigating the hydrogen outgassing phenomena caused by charged particles or radiation from the cryopumping. An experiment system fabricated in Korea Research Institute of Standard and Science (KRISS) to investigate electron stimulation desorption (ESD) ions of hydrogen adsorbed on the cold surfaces; the cryogenic metal surfaces for cryopumping and gauging materials. The system consists of UHV chamber, vacuum pumps (two turbo molecular pumps and a dry pump), a residual gas analyzer, an electron gun and a micro channel plate (MCP) for ions detection.

We will present the relation between ESD  $H^+$  from the physisorbed hydrogen on the cold surface and the amount of hydrogen adsorbed and also  $H_2$  pressure upon the cold surface to elucidate fundamental process of hydrogen outgassing from the cryopumping caused by charged particles and radiations. It is found that the desorption yields of  $H^+$  ions increased linearly from pressure  $3.81 \times 10^{-9}$  Pa to  $5.63 \times 10^{-8}$  Pa and then remained almost constant till  $7.76 \times 10^{-7}$  Pa Pa and again increased till  $1 \times 10^{-5}$  Pa. The pressure region below to  $3.81 \times 10^{-9}$  Pa is still to explore.