

A method to quantitatively evaluate Non-evaporable-getter pump for use in space science mission

*Seiya Nishimura¹, Ichiro Yoshikawa¹, Kazuo Yoshioka¹, Shogo Arao¹, Zhang Tianxu¹

1. The university of tokyo

Observation instruments are known to deteriorate under atmospheric condition. Deterioration are mainly caused by reaction with water vapor and oxygen. To prevent this, observation instruments must be maintained under vacuum. The problem is that the conventional vacuum pump are too heavy to carry to the launching site. The need of continuous power supply makes the transport more difficult. Also the vacuum pump must be removed before the launch. These problems are not only making it difficult to maintain observation instruments under vacuum but also causing extra costs. Non-evaporable-getter (NEG) pumps are able to solve these problems. NEG pumps are light weight, compact, oil free, vibration free, and able to operate without energy supply after activation. Considering the utilization of NEG pump for space science missions, we need to quantitatively evaluate the NEG pump to optimize its size, shape, material, and mounting position for each mission. In this study, a method to measure pumping speed of NEG pump for carbon monoxide (as substitute to water vapor and oxygen) was established by using the orifice method. By using this method, it will be able to develop a NEG pump which best applies the case for each mission.

Keywords: Non-evaporable-getter pump, vacuum pump