

Cooling sensor head of the gamma ray spectrometer by using small cooler toward microsatellites

(超小型衛星搭載に向けたガンマ線分光計の小型冷凍機による冷却)

Takuto Adachi¹, Nobuyuki Hasebe^{1,2}, Hiroshi Nagaoka², Masayuki Naito¹

¹School of Advance Science and Engineering, Waseda University

²Research Institute for Science and Engineering, Waseda University
3-4-1, Okubo, Shinjuku, Tokyo 169-8555, Japan

ABSTRACT

The gamma ray spectrometer (GRS) is useful for observing elemental abundances of lunar and planetary bodies. In order to distinguish many line gamma rays with various energies, good energy resolution is needed for the GRS. The high purity germanium (HPGe) gamma ray spectrometer has sufficient energy resolution. However it is necessary for maintaining high energy resolution to cool down the HPGe below 90 K during the operation. Recently, there has been an increasing demand for small satellites. Hence, we develop light weight GRS that can be onboard miniature satellite. For downsizing the GRS, it is inevitable to reduce the cooling system weight. To achieve the goal, we use the K508 microcooler for the GRS cooling system. The GRS weight is about 3.7kg with 200 cm³ HPGe. This paper describes the background, the instrument design and cooling experiment method.