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Performance of gamma-ray spectrometer for measuring chemical composition in Lunar and Planetary surfaces

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In order to develop satellite-borne gamma-ray detectors for elemental analysis of planetary surface, we have tested CdTe semiconductor detectors. The CdTe gamma-ray detectors give high energy resolution and operate in higher temperature conditions than other semiconductors, such as silicon and germanium. Especially, for operation on the moon, CdTe spectral performance in higher temperature than room temperature is important.

First, we evaluated leak current and energy resolution of two CdTe single detectors. They have different electrodes, one is anode-In cathode-Pt (In/CdTe/Pt), the other is anode-Al cathode-Pt (Al/CdTe/Pt).

Second, we have developed a prototype In/CdTe/Pt detector whose cathode electrode is strip structure. We evaluated its energy resolution using gamma-rays from radioisotope in the temperature up to 40 degree Celsius. Here we report these results and some discussions about the causes which determine energy resolution.