



Performance of Alpha Ray Detector (ARD) for mapping of Rn and Po in the lunar surface onboard Japanese lunar mission SELENE

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Alpha Ray Detector (ARD) will be on-board SELENE, a Japanese lunar orbiter to be launched around 2007. Primary target is the alpha particles emitted by ^{222}Rn and ^{210}Po . It is trapped by the lunar gravity and decays with the half-life of 3.8 days emitting 5.490 MeV alpha particles. In the decay sequence of ^{222}Rn , ^{210}Po emits alpha particle with the energy of 5.305 MeV. Time scale of the activity is dominated by the 21-year half-life of ^{210}Pb . Results from Apollo 15, 16, and recent Lunar Prospector mission indicate that the average amount of radon on the lunar surface is much smaller than expected, and the radon-alpha distribution suggests that radon comes out through gas emanation from fissures of the lunar surface. We developed a large-area detector of 326 cm² for the ARD, which is 15-20 times larger than the detectors of Apollo and Lunar Prospector. Reduction of the background was achieved with the anticoincidence by rejecting cosmic-ray tracks. It will enable (1) precise global mapping of the radioactive material on the lunar surface, (2) identification of gas emanation, (3) study of the radon gas emanation mechanism on the lunar surface and the origin of the lunar atmosphere, and (4) obtaining information on the crustal movement during the last - 50 years. We will present the performance of the ARD and recently status in this paper.