

Development Status of Korean Radioisotope Thermoelectric Generator

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Radioisotope Thermoelectric Generator (RTG) is one of the most promising power sources which generate stable electricity in a tough environment such as space, deep sea, and arctic area owing to its high reliability and long lifetime. Therefore, RTGs have been applied in many space missions of USA, Russia, and so on. Recently, Korean government announced a plan for lunar exploration, and Korea Atomic Energy Research Institute has been started researches about RTGs to supply electric energy for the lunar lander or the rover. In the RTG, because decay heat of radioisotope is converted to electric energy, technologies for fabrication and treatment of radioisotope, radiation shield, thermoelectric material, shock protection, and heat insulation should be considered. KAERI tested several RTG designs by referring to the designs of USA and Russia, and found out design variables which affect the efficiency of thermoelectric conversion. Then, a simulator which analyzes the efficiency of thermoelectric conversion has been developed, and its performance was verified with several sample tests. Finally, a new RTG was designed for 100 watts of heat input, which uses BiTe type as a thermoelectric material. In this study, development status of RTG and future works will be introduced.