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C3Or4A-01: Hermetic wall material optimization on a heat switch used for ADR application

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Hold time of an adiabatic demagnetization refrigerator(ADR) is very important for astronomy missions. The hold time depends on two factors, ADR's cooling power and heat load. Generally, the cooling power of an ADR is small. It becomes necessary to minimize heat load. A main source of heat load comes from the gas gap heat switch (GGHS). When the GGHS is in OFF status, the heat load is demined by the hermetic outer tube, which is usually made by metal alloys. Ceramicnd polymer materials have a low thermal conductivity at low temperature. This feature makes them possible to play the role of hermetic outer tube. In order to verify the feasibility, the thermal conductivity of several candidates were tested down to 200mK.A GGHS prototype was made and the helium leakage test were done after 10 times temperature cycle. The test result is shown and discussed in this paper.

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