

Experimental research on heat transfer performance of low temperature support structure

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The design of the support structure of high vacuum and low temperature adiabatic vessel should not only meet the mechanical design requirements such as strength, but also meet the thermodynamic requirements such as low leakage heat. A cylindrical dry calorimeter based on two-stage G-M refrigerator was designed and built, and the heat transfer performance of the support structure was tested. The support structure under test has three fixed temperature ends, which are 300 K at the room temperature end, 80 K at the cold screen connection end and 10 K at the inner Dua connection end. The test results and heat leakage analysis when meeting the temperature requirements show that the heat leakage power Q_1 of the support structure in the temperature zone of 300 K~77 K is 3.308 W and the heat leakage power Q_2 in the temperature zone of 80 K~10 K is 0.247 W.

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