

Functional improvement by the temperature distribution measurement of the out gas examination device and the improvement

Kyushu Institute of Technology engineering department

B4 Cho Lab. Shinagawa Masaharu

1. A study background and purpose

In outer space, the satellites are bleached in the intense environment such as the high vacuum, radiation, ultraviolet rays and heat cycle.

Gas called the out gas occurs from the materials Which I use when a heat cycle is repeated under a high vacuum in particular and it condenses to deployment apparatuses again and has a big influence on a mission. This is a serious problem.

In late year, a development cost is lower in a micro miniature satellite than a large satellite and smallsat, and for reasons of finishing it or finishing it in a short development period, development is performed in a university, a medium and small-sized business, developing countries and uses materials for many fault space on producing it.

Because much out gas may be generated from materials for non-space, you must examine out gas based on testing method called ASTM E-595.

I produced an out gas examination device in the principal school in 2012.

However, there is the part that the device is beyond a temperature rule range of ASTM E-595 and aimed for the temperature correction.

2. Experimental equipment

In the device, these is the heating stick which simulated the part which out gas produces and the cooling board which simulated the part which a pollutant attaches to.

There are 12 rooms which put an examination sample in a heating stick and 12 places of

points to attach a collector plate measuring the quantity of the pollutant which attached to a cooling board to.

There are two sets (24) in total.

The temperature range prescribed in ASTM E-595 is heating stick 125 ± 1 degrees Celsius cooling board 25 ± 1 degrees Celsius.

3. Experimental approach

I changed the bearing areas of a heater and the device and the setting temperature of the heater and adjusted it.

I adjusted the cooling board by a temperature set point of the coolant and the PID control.

4. Heating stick adjustment result

Usable examination rooms increased in 16 rooms from seven rooms

5. Cooling board adjustment result

12 places became available.

6. Summary

	Before	After
Heating stick	7	16
Cooling plate	7	12

