

## 氢(氘)通量容器异常放热实验小结

Summary of abnormal exothermic experiment of hydrogen (deuterium) flux vessel

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摘要

Abstract

假设载氢（氘）金属异常放热现象与金属内部氢通量有关，于是设计了一种容器。容器由内容器和外容器组成，在内容器中充氘或充氢。外容器抽真空，对内容器进行加热，观察异常放热现象。实验观察到异常放热，产生了多余的热功率，氢气有多余的热功率，氘气也有多余的热功率，内容器充氢气观察到最高 5 瓦的多余热功率。内容器充氢气时产生多余热功率持续时间约 3 小时。内容器充氘气观察到最高 13 瓦的多余热功率。内容器充氘气时产生多余热功率持续时间约 3 小时。内容器充氘气时产生的多余热功率高于内容器充氢气时的多余热功率。

A container was designed based on the assumption that the abnormal exothermic phenomenon of hydrogen (deuterium) metal is related to the hydrogen flux inside the metal. The container consists of an inner container and an outer container, and the inner container is filled with deuterium or hydrogen. The outer container is evacuated, the inner container is heated, and abnormal heat generation is observed. Both hydrogen and deuterium gas produce excess heat power; deuterium produces more heat, lasting longer. When the inner container is filled with hydrogen a maximum of 5 watts of excess heat power is observed, lasting about 3 hours. When the inner container is filled with deuterium it produces higher power than hydrogen, with maximum excess heat power up to 13 watts, also lasting about 3 hours.

关键词 氢（氘）通量，内容器，异常热功率

Key words: hydrogen (deuterium) flux, inner container, abnormal thermal power

### 1、容器

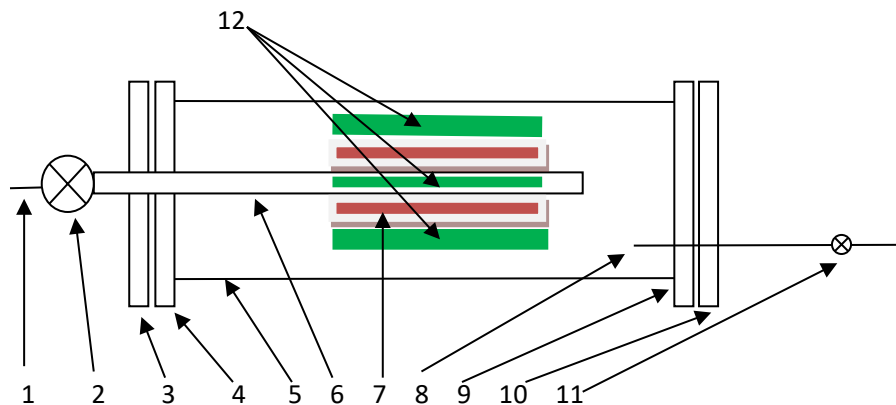
#### 1. Container

设计一种产生持续氘通量的装置，以确认氢（氘）通量在常温核反应的作用

In order to confirm the role of hydrogen (deuterium) flux in nuclear reaction at room temperature, a device for generating continuous deuterium flux was designed

## 容器构造图

### Vessel construction schematic



(1) 不锈钢管，外径 6mm 壁厚 1.5mm，可以接真空泵和气源

(1) Stainless steel pipe, with an outer diameter of 6 mm and a wall thickness of 1.5 mm, can be connected to a vacuum pump and air source

(2) 阀门

(2) Valve

(3) CF 真空法兰盲板 DN100

(3) CF vacuum flange blind plate DN 100

(4) CF 真空法兰 DN 100

(4) CF vacuum flange DN 100

(5) 外容器外壳，

(5) **Outer container shell,**

材质 316 不锈钢，DN100\*3，长 500mm

Material 316 stainless steel, DN 100 \* 3, length 500mm

(6) 内容器，

(6) **inner container**

用镀钯不锈钢管制作，直径 DN25\*2,长 500mm，一端封闭，镀钯厚度 10 微米

The inner container is made of palladium plated stainless steel pipe with diameter of DN25 \* 2, length of 500 mm, with one end closed, and palladium plating thickness of 10  $\mu$  M (6) Palladium plated stainless steel pipe, diameter DN25 \* 2, length 500 mm, one end closed, palladium plating thickness 10  $\mu$ m

(7) 加热器

(7) Heater

(8) 不锈钢管，外径 6mm 壁厚 1.5mm，可以接真空泵和气源

(8) Stainless steel pipe, with an outer diameter of 6 mm and a wall thickness of 1.5 mm, can be connected to a vacuum pump and air source

(9) CF 真空法兰 DN 100

(9) CF vacuum flange DN 100

(10) CF 真空法兰盲板 DN100

(10) CF vacuum flange blind plate DN 100

(11) 阀门

(11) Valve

(12) 涂钯镍网，内容器放置 60 克，外容器放置 300 克

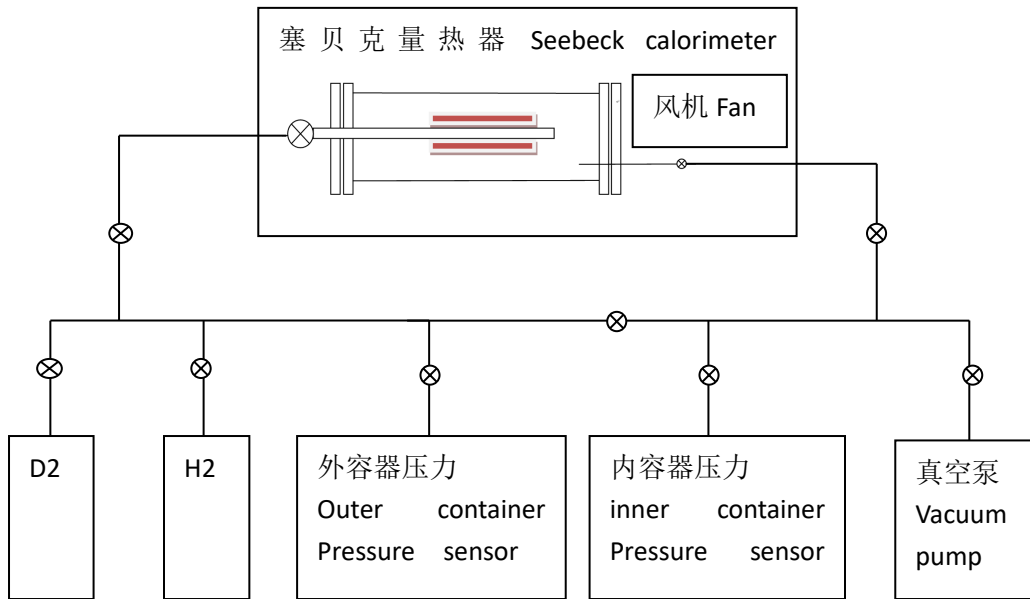
(12) Coated with palladium nickel mesh, 60 g of inner container and 300 g of outer container

## 2、实验系统

### 2. Experimental system

实验系统图如下

The experimental system diagram is as follows



## 3、实验过程

### 3. Experimental process

(1) 抽真空，内容器外容器同时抽真空

(1) Evacuate the inner container and outer container of the container simultaneously

(2) 加热器加热 200、250、300 瓦

(2) Heater heating 200、250、300 watts

(3) 热平衡后（约 6 小时），外容器保持抽真空，给内容器充入 100 kpa-200 kpa 氘气或氢气

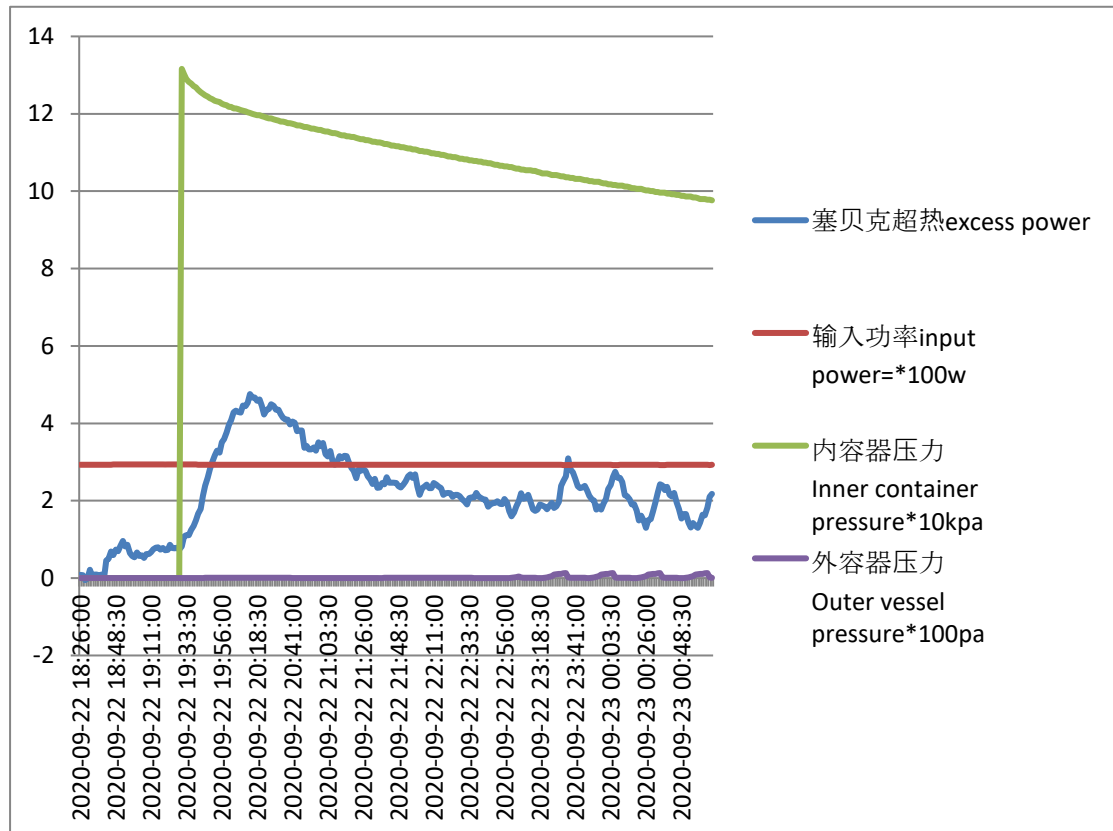
(3) After thermal equilibrium is reached (which takes about 6 hours), the outer container was kept evacuated and the inner container was filled with 100 -200 kPa deuterium or hydrogen

(4) 观察异常放热情况，可以看到有一个异常放热波形，持续约 3 小时，

(4) Observing the abnormal heat release, we can see that there is an abnormal exothermic waveform, lasting for about 3 hours.

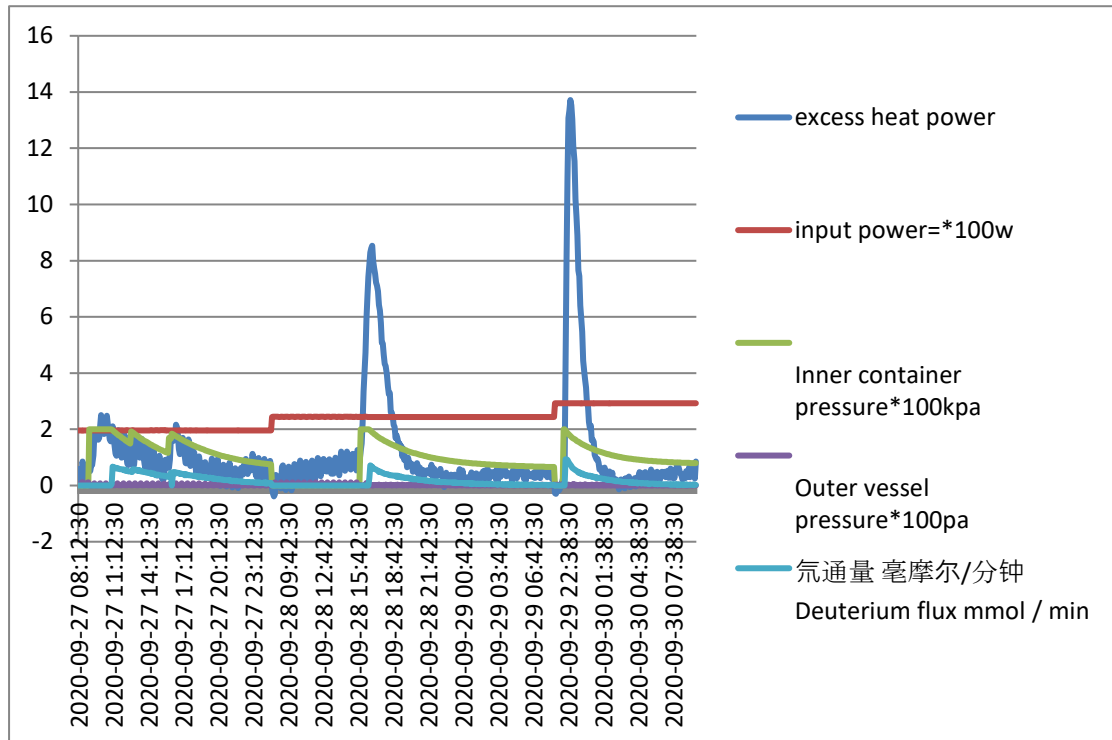
内容器充氢气，外容器抽真空时的异常放热图

Diagram of abnormal heat release when the inner container is filled with hydrogen and the outer container is evacuated



内容器充氘气，外容器抽真空时的多余热功率图

Diagram of excess heat power when the inner container is filled with deuterium gas and the outer container is evacuated



#### 4、小结

##### 4. Summary

4.1 当内容器充氘气或氢气时，可以观察到三小时的异常放热

4.1 when the content unit is filled with deuterium or hydrogen, abnormal heat release for three hours can be observed

4.2 异常放热值不大，约几瓦至十几瓦

4.2 the abnormal exothermic value is small, ranging from a few watts up to more than ten watts

4.3 因为异常放热值不大，维持时间较短，不能判断是否超过化学能

4.3 because the abnormal exothermic value is not large and the effect only continues for a short time, it is not possible to judge whether the excess heat exceeds the limits of chemical energy