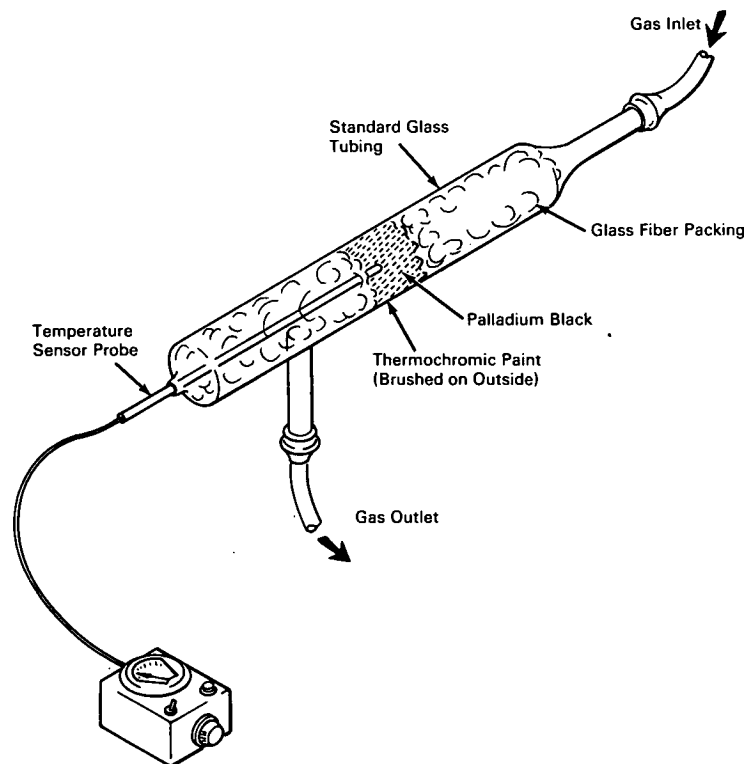


# NASA TECH BRIEF



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## "Sniffer" Used as Portable Hydrogen Leak Detector



### The problem:

To design a simple, rapid device, preferably portable, for the detection of hydrogen in air, oxygen, nitrogen, or helium. Many modern test facilities use large quantities of hydrogen and a safety hazard would exist if leaks of the highly flammable gas were not closely controlled.

### The solution:

A "sniffer" type portable monitor that indicates the presence of hydrogen in contact with activated palladium black by a change in the color of a thermo-chromic paint, and indicates the quantity of hydrogen present by means of a sensor probe and continuous readout.

(continued overleaf)

**How it's done:**

The sniffer consists of a short, thin-walled glass or metal tube, packed with 0.5 g of powdered, activated palladium black held in place with compressed glass fibers. The outside of the tube adjacent the palladium black is coated with a thermochromic paint having two successive color change points, at 55° and 85°C. A temperature sensing probe is inserted and sealed into one end of the tube so that it penetrates the mass of the palladium black. The sensor is connected to appropriate instrumentation to give a continuous, direct indication of temperature changes.

In operation, the ambient is drawn through the gas inlet so that it passes through the palladium black. As hydrogen contacts the palladium black, heat is released in direct proportion to the density of the hydrogen. As this temperature passes 55°C, the thermochromic paint changes color to give a visual indication of the presence of hydrogen. Simultaneously, the temperature sensing probe instrumentation registers the change, which, with instrument calibration, can give direct, quantitative data.

**Notes:**

1. An alternate, more passive method uses a finely woven but porous glass fiber tape or pillow impregnated with palladium black and coated with a pattern of thermochromic paint. Hydrogen entering the porous packet reacts with the palladium black to liberate heat and cause the thermochromic paint to change color.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama 35812  
Reference: B66-10356

**Patent status:**

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C., 20546.

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