NASA TECH BRIEF
Goddard Space Flight Center

Coaxial Anode Improves Sensitivity of Gas Radiation Counters

The problem:

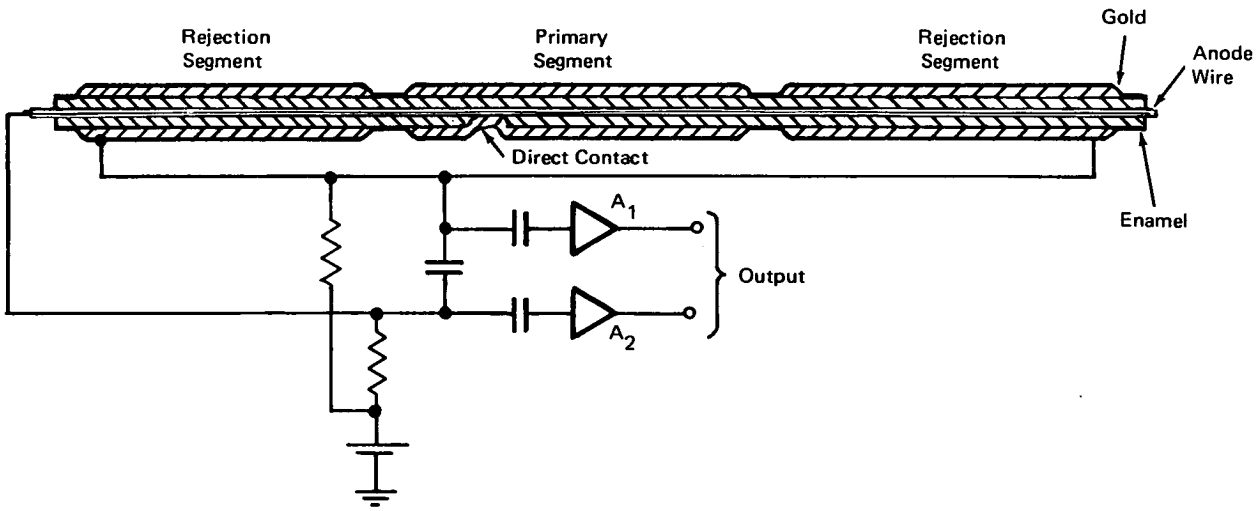
The sensitivity of gas radiation counters is often reduced by background (cosmic and gamma) radiation. For example, in proportional counters used for the measurement of X-rays, gas is ionized by the primary low energy X-rays as well as cosmic and gamma rays. As a result, low X-ray radiation levels cannot be detected in the background of cosmic and gamma radiation. Much of the background can be eliminated by special protective counters which surround the X-ray counter on three sides. But near the ends of the X-ray counter anode, where electrical connections are made, no protective counters have been possible.

The solution:

A new coaxial anode developed for gas radiation counters suppresses background radiation.

How it's done:

In the simplified illustration shown, the anode wire itself is enclosed by three segments. The two on the ends are the rejector (background) segments, and the middle one is the primary charge-detecting segment. The anode wire is made from tungsten approximately 0.001 inch (0.025 mm) in diameter. The wire is surrounded by an enamel insulation which is 0.0005 inch (0.013 mm) thick. The enamel is covered by segments of vapor-deposited gold. At one point in the center segment, the gold layer makes a direct contact with the anode wire.



Coaxial Anode

(continued overleaf)

The rejection segments are connected in parallel to a charge-sensitive amplifier A_1, while the primary segment is connected to amplifier A_2. The amplifier outputs are connected to a detecting circuit (not shown). The connection is made so that the primary segment is in anticoincidence with the rejection segments. The ionization that is recorded simultaneously on all three segments is rejected as background interference.

Note:

Requests for further information may be directed to:

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Reference: TSP74-10229

Patent status:

This invention has been patented by NASA (U.S. Patent No. 3,812,358). Inquiries concerning nonexclusive or exclusive license for its commercial development should be addressed to:

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