TO: KSI/Scientific & Technical Information Division  
Attention: Miss Winnie M. Morgan

FROM: GP/Office of Assistant General Counsel for Patent Matters

SUBJECT: Announcement of NASA-Owned U.S. Patents in STAR

In accordance with the procedures agreed upon by Code GP and Code KSI, the attached NASA-owned U.S. Patent is being forwarded for abstracting and announcement in NASA STAR.

The following information is provided:

U.S. Patent No. : 3,745,357

Government or Corporate Employee : U.S. Government

Supplementary Corporate Source (if applicable) :  

NASA Patent Case No. : LEW-11,159-1

NOTE - If this patent covers an invention made by a corporate employee of a NASA Contractor, the following is applicable:

Yes No

Pursuant to Section 305(a) of the National Aeronautics and Space Act, the name of the Administrator of NASA appears on the first page of the patent; however, the name of the actual inventor (author) appears at the heading of column No. 1 of the Specification, following the words "... with respect to an invention of ... ."

Elizabeth A. Carter

Enclosure

Copy of Patent cited above
An apparatus and method wherein the capacitance of a semi-conductor junction subjected to an electromagnetic radiation field is utilized to indicate the intensity or strength of the electromagnetic radiation is described.

3 Claims, 1 Drawing Figure
METHOD AND APPARATUS FOR MEASURING ELECTROMAGNETIC RADIATION

ORIGIN OF THE INVENTION

The invention described herein was made by employees of the United States Government and may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

BACKGROUND OF THE INVENTION

This invention relates to measuring instruments and is directed more particularly to a method and apparatus for measuring electromagnetic radiation.

Up to the present time, one of the most common ways of measuring gamma radiation emitted from radioactive materials has been to utilize an ionization chamber system. Such systems require relatively high voltage, have considerable background noise, and are expensive because of the power supplies, high voltage cabling and instrumentation which must be incorporated in such a system. Furthermore, even miniature-type ion chambers are often larger than desired for use in nuclear reactor work.

Some devices have been constructed which utilize semiconductor diodes to measure gamma radiation. However, these devices are generally based upon the change of conductance or photovoltaic effect of the diode as a function of electromagnetic radiation intensity. Because the conductance, photovoltage and photocurrent of a diode do not change linearly with respect to the change in strength of electromagnetic radiation, complicated correction and calibrating circuits must be provided.

As is well known, visible light has been measured in the past by light meters. Such instruments use a semiconductor junction which generates a voltage when subjected to visible light.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the invention to provide a new and novel semiconductor electromagnetic radiation measuring device.

It is another object of the invention to provide an apparatus and method for utilizing a relatively linear characteristic of a semiconductor junction to measure electromagnetic radiation.

Still another object of the invention is to provide a method and apparatus which utilizes a-c in measuring and detecting sections of the apparatus to minimize background noise.

It is another object of the invention to provide a method and apparatus for accurately measuring electromagnetic radiation in a field which may also include neutrons.

In summary, the inventive method and apparatus accurately measure electromagnetic radiation without excessive background noise and in the presence of neutrons and at low cost.

DESCRIPTION OF THE DRAWINGS

The single FIGURE is a schematic diagram of apparatus embodying the invention.
It will be understood that changes and modifications may be made to the foregoing invention by those skilled in the art without departing from the spirit and scope of the invention as set forth in the claims appended hereto.

What is claimed is:

1. A gamma radiation measuring device comprising:
   a semiconductor device at least one p-n junction;
   a light-tight metal enclosure disposed around said semiconductor device, said metal being selected from the group consisting of aluminum, beryllium and titanium;
   an A-C capacitance bridge; and
   signal carrying means connecting said last named means to said p-n junction of said semiconductor device whereby the capacitance of said one junction of said semiconductor device may be measured when said semiconductor is subjected to gamma radiation to indicate the intensity of said gamma radiation.

2. The radiation measuring device of claim 1 wherein said semiconductor device is a diode.

3. A method of measuring gamma radiation comprising the steps of:
   disposing a p-n junction in a gamma field of unknown strength;
   measuring the capacitance of said junction with an A-C capacitance bridge to obtain a measurement of the known field strength;
   shielding said junction from electromagnetic radiation of a predetermined range of wave-lengths;
   disposing said junction in a gamma field of unknown strength; and
   measuring the capacitance of said junction with an A-C capacitance bridge to determine the magnitude of gamma radiation of said field of unknown strength.

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