受験番号：26IPE004

問 1

What is claimed is:

1. An energy dispersive X-ray detection apparatus for irradiating a sample with an electron beam or an X-ray, detecting a characteristic X-ray generated from a surface of the sample, and performing elemental analysis, the energy dispersive X-ray detection apparatus comprising:

an element holder housing a semiconductor X-ray detection element, the element holder including a cylindrical female screw; and

a finger body housing a substrate including a first-stage field-effect transistor (FET) for amplifying a signal from the semiconductor X-ray detection element, the finger body including a cooling mechanism and a male screw,

wherein the female screw and the male screw fasten the element holder and the finger body to fix the semiconductor X-ray detection element.

2. The energy dispersive X-ray detection apparatus according to claim 1, wherein the element holder housing the semiconductor X-ray detection element is made of a metal material having a large thermal expansion coefficient, whereas the finger body housing the substrate including the first-stage FET is made of a metal material having a thermal expansion coefficient smaller than the thermal expansion coefficient of the element holder.

3. The energy dispersive X-ray detection apparatus according to claim 1, further comprising a slit-like opening in the element holder, the opening being configured to pass a high-voltage wire for supplying a voltage to an electrode of the semiconductor X-ray detection element through the element holder.

問 2

Examples of conventional typical image compression methods include the Joint Photographic Experts Group (JPEG) method standardized by the International Standards Organization (ISO). This is known to use discrete cosine transform (DCT) and to provide good encoded images and decoded images when a relatively large number of coding bits is allocated. When the number of coding bits is reduced to a certain extent, however, block distortion becomes conspicuous and degradation becomes subjectively noticeable.

In recent years, meanwhile, studies have been actively conducted about a method of dividing an image into a plurality of bands by a filter called a filter bank obtained by combining a high-pass filter and a low-pass filter and performing coding for each band. Among these studies, wavelet transform coding, which has no disadvantage that high compression causes conspicuous block distortion like DCT, is regarded as promising alternative technology to DCT.

For example, JPEG 2000, which has been internationally standardized in January 2001, has employed a method obtained by combining high-efficiency entropy coding with this wavelet transform, achieving significant improvement in coding efficiency over JPEG.

問 3

More particularly, the electronic paper device 26 is a conventionally known self-writing device that can display an image of predetermined information on an image display unit with a voltage applied, and can hold the predetermined information in a no-power supply state. When the microcomputer 23 applies no voltage through a driver to each pixel electrode constituting a matrix in the image display unit, negatively charged white particles accumulate on the back side of the image display unit, whereas positively charged black particles accumulate on the surface side. Therefore, when visually observed from the surface side, the image display unit is colored in black. Then, when the driver operates based on electronic data output from the microcomputer 23 and reverses the polarity of the pixel electrodes of a main part of the matrix according to the information to be displayed as an image, a positional relationship between the white particles and the black particles is appropriately switched, and the information image of contrast between the white particles and the black particles is displayed on the image display unit. Also, even in a no-power supply state in which no voltage is applied, via the driver, to each pixel electrode constituting the matrix in the image display unit, the electronic paper device 26 can hold the image display state as it is.

コメント

問 1 は図面がないので装置の構成がよく分かりませんが、請求項中の「収納する」は「収納するように構成される」ではなく「収納されている」と解釈して housing と訳出いたしました。装置の構成が前者の場合なら configured to house を用います。