問 1

1. An energy dispersive X-ray detection device configured to perform elementary analysis by irradiating an electron beam, an X-ray, or the like, to a sample and detecting a characteristic X-ray generated from a surface of sample, the energy dispersive X-ray detection device comprising:

an element holder configured to contain a semiconductor X-ray detecting element, and provided with a cylindrical female screw, and

a finger body configured to contain a substrate including a first-stage FET for amplifying a single from the semiconductor X-ray detecting element, including a cooling mechanism, and provided with a male screw,

wherein the semiconductor X-ray detecting element is configured to be fixed by fastening an element holder and a finger body with the female screw and the male screw.

2. The energy dispersive X-ray detection device according to claim1, wherein while the element holder containing a semiconductor X-ray detecting element is manufactured with a metal material having a high coefficient of thermal expansion, the finger body containing a substrate including a first-stage FET is manufactured with a metal element having a lower coefficient of thermal expansion than the element holder.

3. The energy dispersive X-ray detection device according to claim 1, wherein a slit opening is provided on the element holder so as to be able to run high-voltage wiring for supplying a voltage to an electrode of semiconductor X-ray detecting element through the element holder. (*)コメント: 原文にて前記が付されていない語については定冠詞を付しませんでした。

問 2

As a conventional and typical image compression method, there is a JPEG method standardized by ISO. It is known that this method uses discrete cosine transformation, and in a case that a relatively large number of coding bits are assigned, provides excellent coded images and decoded images. However, in a case that the number of coding bits are

reduced to a certain extent or more, block distortion becomes remarkable and deterioration becomes subjectively conspicuous.

Meanwhile, in recent years, methods in which an image is divided into multiple bands by a filter that is called as a filter bank and combines a high pass filter and a low pass filter, and each of the bands is coded, are actively studied. Among that, wavelet transformation coding is regarded as the most likely new technique replacing DCT, because this coding does not have a flaw in which the block distortion becomes remarkable in high-compression as DCT.

For example, JPEG2000 for which international standardization finished on January, 2001, adopts a method combining this wavelet transformation and high-efficient entropy coding, and realizes significant improvement of coding efficiency compared to JPEG.

問3

Specifically, the electronic paper device 26 is a well-known self-writing type capable of displaying given information as an image on an image display unit in a state of being applied a voltage, and retaining the image in a state of not being supplied a voltage, in a state that a voltage is not applied by the microcomputer 23, to each of pixel electrodes configuring a matrix on the image display unit via a driver, while a negatively (-) charged white particle remains on a back side of the image display unit, a positively (+) charged black particle remains on a front side, and thus the image display unit turns into a state of being colored black when viewed from the front side of the image display unit. In addition, the driver operates based on electronic data outputted from the microcomputer 23, inverts polarity of the pixel electrode of a necessary portion of the matrix according to information to be displayed as an image, then positional relations among the white particles and the black particles appropriately switch, and the information is displayed as an image on the image display unit with contrast of the white particles and the black particles. Further, the electronic paper device 26, even in no power supply condition in which a voltage is not applied to each of the pixel electrodes configuring the matrix on the image display unit via the driver, is capable of maintaining an image display state as it is.