

## 第10回知的財産翻訳検定試験&lt;和文英訳&gt;1級化学 【標準解答】

## [問1]

1. An organic semiconductor gas sensor comprising:
  - a conductive substrate;
  - a photosensitive layer on the conductive substrate, the photosensitive layer comprising a charge generation layer and a charge transport layer, each comprising an organic semiconductor material;
  - a metal electrode on top of the photosensitive layer;
  - lead wires connected to the top of the metal electrode and to an end portion of the conductive substrate, respectively;
  - a voltage generator that is capable of applying a DC voltage across the thickness of the metal electrode and that forms a closed circuit with the conductive substrate via the lead wires;
  - a current detector provided between the voltage generator and the lead wire from the conductive substrate; and
  - a heater for heating the photosensitive layer, the heater being provided in the neighborhood of the photosensitive layer.
2. The organic semiconductor gas sensor according to claim 1, wherein the charge generation layer and the charge transport layer are provided in that order on the conductive substrate.
3. The organic semiconductor gas sensor according to claim 1, wherein the charge generation layer comprises an azo pigment.

(180 words)

## [問2]

[0002]

A bacterium of the genus *Thermosynechococcus* is known to be a useful tool that serves as a host cell for mass producing plant metabolites or thermostable proteins. With a view to using this bacterium for the stated purpose, electroporation has heretofore been commonly applied as a means for transferring a gene into the bacterial cell. In electroporation, an electric pulse is

applied to the host cell to make a pore in the cell membrane, through which an exogenous gene can be transferred into the host cell and integrated into its genome.

[0003]

Introducing genes by electroporation is an effective method which is commonly used in the art. Unfortunately, electroporation has the following problems to be solved before it can be applied in transferring genes into a bacterium of the genus *Thermosynechococcus*.

- (1) An expensive apparatus (electroporator) is required to apply electric pulses to cells.
- (2) It takes as long as 3-4 weeks to establish a transformed strain into which the gene of interest has been transferred.
- (3) Endogenous genes in the bacterium are destroyed during the process of gene transfer.
- (4) The transformed strain is not amenable to sustained culture at an optimum temperature for the growth of the bacterium.

(201 words)

[問3]

[0048]

[Example 1]

A gaseous mixture of 20 vol% carbon dioxide and 80 vol% nitrogen was used as a model of blast furnace gas or exhaust gas from hot blast stoves, and molecular sieve 13X (zeolite) was used as an adsorbent to recover carbon dioxide from the gaseous mixture.

[0049]

A cylindrical quartz pipe having an inside diameter of 3.8 cm and a length of 100 cm was packed with 40 g of the adsorbent; and the gaseous mixture was introduced into one end of the quartz pipe under the conditions of 2 L/min and about 40 °C and was discharged from the other end to allow the adsorbent to adsorb the carbon dioxide in the gaseous mixture until saturation. The

concentration of carbon dioxide in the effluent gas from the quartz pipe was monitored, and saturation was confirmed by finding that the concentration reverted to 20 vol% after first dropping below 20 vol% on account of adsorption. [0050]

Subsequently, while the gaseous mixture was kept flowing, microwaves of 2450 MHz and 200 W were applied for 2 minutes to cause the carbon dioxide to desorb from the adsorbent. Throughout this desorption process, the concentration of carbon dioxide in the effluent gas was measured continuously, and in the period when the measured value exceeded 20 vol% (i.e., the initial concentration of carbon dioxide in the gaseous mixture), the differential concentration was integrated to estimate the amount of the adsorbed and then desorbed carbon dioxide.

(240 words)

(621 words in total)