

[0018] According to the method for electrochemically detecting an analyte of the present invention, the analyte can be detected with high detection sensitivity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] FIG. 1 is a perspective view showing a detector which is used for a method for electrochemically detecting an analyte according to first and second embodiments of the present invention;

[0020] FIG. 2 is a block diagram showing the configuration of the detector shown in FIG. 1;

[0021] FIG. 3 is a perspective view showing a detection chip which is used for the method for electrochemically detecting an analyte according to first and second embodiments of the present invention;

[0022] FIG. 4A is a cross sectional view in an AA line of the detection chip shown in FIG. 3;

[0023] FIG. 4B is a perspective view of the upper substrate of the detection chip shown in FIG. 3 as viewed from the lower surface;

[0024] FIG. 4C is a perspective view of the lower substrate of the detection chip shown in FIG. 3 as viewed from the upper surface;

[0025] FIG. 5 is a cross sectional explanatory view showing an example of a portion including electrodes in the detection chip to be used in the method for electrochemically detecting an analyte according to the first embodiment of the present invention;

[0026] FIG. 6 is a process explanatory view showing the procedure of the method for photoelectrochemically detecting an analyte according to the first embodiment of the present invention;

[0027] FIG. 7 is an outline explanatory view showing detection processes in a conventional method for electrochemically detecting an analyte;

[0028] FIG. 8 is a process explanatory view showing another example of the procedure of the method for photoelectrochemically detecting an analyte according to the first embodiment of the present invention;

[0029] FIG. 9 is a process explanatory view showing an example of the procedure of the oxidation reduction current/electrochemiluminescence detection method for an analyte according to the first embodiment of the present invention;

[0030] FIG. 10 is an outline explanatory view showing DNAs used in Test example 1-1;

[0031] FIG. 11 is an outline explanatory view showing the operating procedure of (Example 1-1) the method for electrochemically detecting an analyte in Test example 1-1;

[0032] FIG. 12 is an outline explanatory view showing the operating procedure of (Comparative example 1-1) the method for electrochemically detecting an analyte in Test example 1-1;

[0033] FIG. 13 is a graph showing examined results of a relationship between the kind of the detection method and photocurrent in Test example 1-1;

[0034] FIG. 14 is an outline explanatory view showing DNAs used in Test example 1-2;

[0035] FIG. 15 is an outline explanatory view showing the operating procedure of (Example 1-2) the method for electrochemically detecting an analyte in Test example 1-2;

[0036] FIG. 16 is an outline explanatory view showing the operating procedure of (Comparative example 1-2) the method for electrochemically detecting an analyte in Test example 1-2;

[0037] FIG. 17 is a graph showing examined results of a relationship between the kind of the detection method and photocurrent in Test example 1-2;

[0038] FIG. 18 is an outline explanatory view showing DNAs used in Test example 1-3;

[0039] FIG. 19 is an outline explanatory view showing the operating procedure of (Example 1-3) the method for electrochemically detecting an analyte in Test example 1-3;

[0040] FIG. 20 is an outline explanatory view showing the operating procedure of (Comparative example 1-3) the method for electrochemically detecting an analyte in Test example 1-3;

[0041] FIG. 21 is a graph showing examined results of a relationship between the kind of the detection method and photocurrent in Test example 1-3;

[0042] FIG. 22 is a cross sectional explanatory view showing an example of a portion including electrodes in the detection chip to be used in the method for electrochemically detecting an analyte according to the second embodiment of the present invention;

[0043] FIG. 23 is a process explanatory view showing an example of the procedure of the method for photoelectrochemically detecting an analyte according to the second embodiment of the present invention;

[0044] FIG. 24 is an outline explanatory view showing detection processes in a conventional method for electrochemically detecting an analyte;

[0045] FIG. 25 is a process explanatory view showing another example of the procedure of the method for photoelectrochemically detecting an analyte according to the second embodiment of the present invention;

[0046] FIG. 26 is a process explanatory view showing an example of the procedure of the oxidation reduction current/electrochemiluminescence detection method for an analyte according to the second embodiment of the present invention;

[0047] FIG. 27 is an outline explanatory view showing a detection process (27A) when an analyte is detected using a label binding substance obtained in Example 2-1 (Test No. 1) and a detection process (27B) when an analyte is detected using a labeled antibody obtained in Comparative example 2-1 (Test No. 3) in Test example 2-1;

[0048] FIG. 28 is a graph showing examined results of a relationship between the kind of the detection method and photocurrent in Test example 2-1;

[0049] FIG. 29 is a process explanatory view showing a part of the procedures of the method for electrochemically detecting an analyte of Test No. 5 in Example 2-2;

[0050] FIG. 30 is a process explanatory view showing a part of the procedures of the method for electrochemically detecting an analyte of Test No. 7 in Comparative example 2-2;

[0051] FIG. 31 is an outline explanatory view showing detection processes (31A) and (31B) in the method for electrochemically detecting an analyte using Test No. 5 in Example 2-2 and Test No. 7 in Comparative example 2-2;

[0052] FIG. 32 is a graph showing examined results of a relationship between the kind of the detection method and photocurrent in Test example 2-2;

[0053] FIG. 33 is an outline explanatory view of a biotinylated-DNA/Alexa Fluor 750-labeled DNA complex obtained in Preparation example 2-5;

[0054] FIG. 34 is a process explanatory view showing a part of the procedures of the method for electrochemically detecting an analyte of Test No. 9 in Example 2-3;