**[0077]** The lower substrate **40** includes a substrate body **40***a*, a counter electrode **66**, and a reference electrode **69** as shown in FIG. **4**C. The substrate body **40***a* is formed into a rectangular shape with almost the same size as the substrate body **30***a* of the upper substrate **30**. It does not need that the substrate body **40***a* has the same size as the substrate body **30***a*.

**[0078]** The material for forming the substrate body **40***a* is not particularly limited. Examples thereof include glass, plastics such as polyethylene terephthalate and polyimide resin; and inorganic materials such as metal. Among them, the glass is preferred from the viewpoint of ensuring heat resistance, durability, and smoothness and reducing the cost required for the materials. The thickness and size of the substrate body **40** are the same as those of the substrate body **30***a* of the upper substrate **30**.

**[0079]** The counter electrode **66**, an electrode lead **72** connected to the counter electrode **66**, the reference electrode **69**, and an electrode lead **73** connected to the reference electrode **69** are formed on the surface of the substrate body **40***a*. In the lower substrate **40**, the counter electrode **66** is disposed at one side portion of the substrate body **40***a* [the right side of FIG. **4**C]. The reference electrode **69** is disposed at a position opposed to the counter electrode **66** on the substrate body **40***a*. The electrode lead **72** of the counter electrode **66** and the electrode lead **73** of the reference electrode **69** are extended from one side portion of the substrate body **40***a* [the right side of FIG. **4**C] to the other side portion [the left side of FIG. **4**C]. The electrode leads **72** and **73** are disposed at the other side portion of the substrate body **40***a* [the left side of FIG. **4**C] so as to be parallel to each other. The electrode lead **72** and **73** are protruded from the portion where the upper substrate **30** and the lower substrate **40** are overlapped and exposed to the outside [see FIGS. **3** and **4**A]. The substrate body **30***a* and the substrate body **40***a* are desirably substrate bodies formed of a material having permeability when light is emitted so as to transmit the substrate body. In this case, of the substrate body **30***a* and the substrate body **40***a*, the substrate body to be irradiated with light may be formed from the material having permeability.

**[0080]** Subsequently, the working electrode **60**, the counter electrode **66**, and the reference electrode **69** will be explained in detail.

**[0081]** Referring to FIGS. **5** and **22**, the working electrode **60** is formed into a nearly rectangular shape. The working electrode **60** is configured to include a working electrode body **61** formed on the substrate body **30***a* and trapping substances **81** or **281** immobilized on the working electrode body **61** as shown in FIGS. **5** and **22**. The electrode lead **71** is connected to the working electrode body **61**.

**[0082]** In the detection chip which is used for the photoelectrochemical detection method to be described later, the working electrode body **61** is formed of a semiconductor which receives electrons from the analyte generated by irradiation with excitation light. The semiconductor functions as a conductive body and an electron acceptor. The semiconductor may be a substance which may have an energy level capable of injecting electrons from the analyte excited by light. Here, the term "energy level capable of injecting electrons from the analyte excited by light" means a conduction band. That is, the semiconductor may have an energy level lower than an energy level of lowest unoccupied molecular orbital of the labeling substance (LUMO) to be described later. The semiconductor is not particularly limited. Examples thereof include element semiconductors such as silicon and germanium; oxide semiconductors containing oxides of titanium, tin, zinc, iron, tungsten, zirconium, hafnium, strontium, indium, cerium, yttrium, lanthanum, vanadium, and niobium, tantalum; perovskite-type semiconductors such as strontium titanate, calcium titanate, sodium titanate, vanadium titanate, and potassium niobate; sulfide semiconductors containing sulfides of cadmium, zinc, lead, silver, antimony, and bismuth; semiconductors containing nitrides of gallium and titanium; semiconductors composed of selenides of cadmium and lead (e.g. cadmium selenide); semiconductors containing telluride of cadmium; semiconductors composed of phosphorus compounds of zinc, gallium, indium, and cadmium; and semiconductors containing compounds such as gallium arsenide, copper-indium selenide, and copper-indium sulfide; and compound semiconductors of carbon or organic semiconductors. The semiconductors may be either intrinsic semiconductors or extrinsic semiconductors. Among the above semiconductors, the oxide semiconductors are preferred. Among the intrinsic semiconductors of the oxide semiconductors, titanium oxide, zinc oxide, tin oxide, niobium oxide, indium oxide, tungsten oxide, tantalum oxide, and strontium titanate are preferred. Among the extrinsic semiconductors of the oxide semiconductors, indium oxide (ITO) which includes tin as a dopant and tin oxide (FTO) which includes fluorine as a dopant are preferred. The thickness of the working electrode is usually from 0.1 to 1 μm, preferably from 0.1 to 200 nm, more preferably from 0.1 to 10 nm.

**[0083]** In the present invention, the working electrode body **61** in the detection chip to be used for the photoelectrochemical detection method may be formed of a semiconductor layer and a conductive layer. In this case, the electrode lead **71** of the working electrode body **61** is connected to the conductive layer.

**[0084]** A semiconductor for forming the semiconductor layer is the same as the above-described semiconductor. In this case, the thickness of the semiconductor layer is preferably from 0.1 to 100 nm, more preferably from 0.1 to 10 nm.

**[0085]** The conductive layer is formed of a conductive material. Examples of the conductive material include metals such as gold, silver, copper, carbon, platinum, palladium, chromium, aluminium, and nickel or an alloy containing at least one of those metals; indium oxide-based materials such as indium oxide and indium oxide (ITO) which includes tin as a dopant; tin oxide-based materials such as tin oxide, tin oxide (ATO) which includes antimony as a dopant, and tin oxide (FTO) which includes fluorine as a dopant; titanium-based materials such as titanium, titanium oxide, and titanium nitride; and carbon-based materials such as graphite, glassy carbon, pyrolytic graphite, carbon paste, and carbon fiber. The thickness of the conductive layer is preferably from 1 to 1000 nm, more preferably from 1 to 200 nm, still more preferably from 1 to 100 nm. The thickness of the conductive layer is desirably a film thickness capable of ensuring the conductivity and making the photocurrent generated from the electrode (back ground current) a minimum photocurrent. The conductive base material may be a composite base material in which a conductive material layer composed of a material having conductivity is formed on the surface of a nonconductive base material composed of nonconductive substances such as glass and plastics. The shape of the conductive material layer may be filmy or spot-like. Examples of the material for forming the conductive material layer include indium