

【CLAIMS】**【Claim 1】**

A method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance, comprising:

a step of forming a primary capture structure with a target substance and a bioreceptor bound by immersing a bioreceptor-attached substrate in a sample solution comprising a target substance;

a step of disposing the substrate with the primary capture structure formed in a centrifuge tube and adding a solution comprising metal nanoparticles into the centrifuge tube; and

a step of forming a secondary capture structure directly coating the metal nanoparticles on the surface of the target substance by operating the centrifuge tube.

【Claim 2】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 1, wherein the bioreceptor-attached substrate is one prepared by a step of attaching the bioreceptor to the substrate by immersing the substrate in a solution containing a surface modifier and a bioreceptor; and a step of attaching a blocking molecule onto a portion of the surface of a substrate without the bioreceptor attached.

【Claim 3】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 2, wherein the blocking molecule is one or more selected from a group consisting of bovine serum

albumin (BSA), casein and skim milk.

【Claim 4】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 1, wherein the solution comprising the metal nanoparticles has a concentration of 1×10^9 to 1×10^{12} particles/mL on average.

【Claim 5】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 1, wherein, in the step of forming the secondary capture structure, the centrifuge is operated at 1,000-6,000xg for 2-5 minutes.

【Claim 6】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 5, wherein the step of forming the secondary capture structure is repeated 3 times or more.

【Claim 7】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 1, wherein, in the step of forming the secondary capture structure, the capture structure is formed as the target substance is sandwiched between the bioreceptor and the metal nanoparticles.

【Claim 8】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 1, which further comprises, after the step of forming the secondary capture structure, a step of attaching a Raman dye on the surface of the metal nanoparticles.

【Claim 9】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 1, wherein the metal nanoparticles are one or more selected from a group consisting of gold (Au), silver (Ag), platinum (Pt), tin (Sn), indium (In), gallium (Ga), thallium (Tl), lead (Pb), bismuth (Bi) and aluminum (Al).

【Claim 10】

The method for manufacturing a surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 1, wherein the metal nanoparticles have a diameter of 10-100 nm on average.

【Claim 11】

The surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance prepared by the method of claim 1.

【Claim 12】

The surface-enhanced Raman scattering (SERS)-based substrate for

detecting a target substance according to claim 11, which further comprises a blocking molecule on a portion of the surface of the substrate without the bioreceptor attached.

【Claim 13】

The surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 12, wherein the blocking molecule is one or more selected from a group consisting of bovine serum albumin (BSA), casein and skim milk.

【Claim 14】

The surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 11, wherein the metal nanoparticles are one or more selected from a group consisting of gold (Au), silver (Ag), platinum (Pt) and aluminum (Al).

【Claim 15】

A surface-enhanced Raman scattering (SERS)-based method for detecting a target substance, which detects a target substance using the surface-enhanced Raman scattering (SERS)-based substrate for detecting a target substance according to claim 12.

【Claim 16】

The surface-enhanced Raman scattering (SERS)-based method for detecting a target substance according to claim 15, wherein the target substance is detected by measuring Raman signals in the wavelength range of 500-2000 cm^{-1} on average

through surface-enhanced Raman scattering (SERS).

【Claim 17】

The surface-enhanced Raman scattering (SERS)-based method for detecting a target substance according to claim 15, wherein the target substance is a protein, a nucleic acid, a DNA, an RNA, an enzyme, an organic molecule, a virus, an extracellular vesicle, a microvesicle, an exosome, a cell, a fat, a metabolite or a pathogen.