the intrinsic viscosity of the hydrophilic polysaccharide is 0.12 dL/g to 0.30 dL/g,

the coating amount of the hydrophilic polymer is 10 mg/g-dry gel to 240 mg/g-dry gel,

the amount of the carboxy group introduced is 15 mmol/L-gel to 55 mmol/L-gel in terms of ion exchange capacity,

the affinity ligand is protein A or a variant thereof, and

the amount of the affinity ligand introduced is 0.10 mmol/L-gel to 1.0 mmol/L-gel.

[10] The affinity chromatography carrier according to any one of [1] to [8], in which the substrate is comprised of at least one selected from the group consisting of an acrylate-based polymer and a methacrylate-based polymer,

the hydrophilic polymer is at least one hydrophilic polysaccharide selected from the group consisting of dextran, carboxymethyl dextran and pullulan,

the intrinsic viscosity of the hydrophilic polysaccharide is 0.12 dL/g to 0.30 dL/g,

the coating amount of the hydrophilic polymer is 10 mg/g-dry gel to 240 mg/g-dry gel,

the amount of the carboxy group introduced is 15 mmol/L-gel to 55 mmol/L-gel in terms of ion exchange capacity,

the affinity ligand is protein A or a variant thereof, and

the amount of the affinity ligand introduced is 0.10 mmol/L-gel to 1.0 mmol/L-gel.

[11] A purification method for purifying a biological substance using the affinity chromatography carrier according to any one of [1] to [10].

[12] The purification method according to [11], in which the pH at the time of adding the biological substance is 5.0 to 9.0.

[13] The purification method according to [11] or [12], in which the pH at the time of eluting the biological substance is 2.0 to 5.0.

[14] The purification method according to any one of [11] to [13], in which the biological substance is an antibody or an antibody derivative.

[0012] According to the present invention, an affinity chromatography carrier exhibiting an excellent antibody adsorption capacity and an excellent purification purity is provided.

[0012a] In one aspect, there is provided an affinity chromatography carrier, comprising:

carboxylated carrier including a substrate and a hydrophilic polymer coating the substrate and introducing a carboxy group thereinto; and

an affinity ligand immobilized into the carboxylated carrier, wherein

the substrate is comprised of at least one selected from the group consisting of a polysaccharide, an acrylate-based polymer, a methacrylate-based polymer and a styrene-based polymer,

the hydrophilic polymer is at least one selected from the group consisting of hydrophilic polysaccharides,

the affinity ligand is at least one selected from the group consisting of an antibody-binding protein and an antibody-binding polypeptide,

a carboxy group is introduced into the affinity chromatography carrier, and

the amount of the carboxy group introduced is 15 mmol/L-gel to 60 mmol/L-gel in terms of ion exchange capacity,

wherein the amount of the carboxy group introduced is measured as described below:

1 g of the carboxylated carrier is suspended in 3 mL of pure water, the resulting suspension is poured into a disposable column having an inner diameter of 15 mm, and the solvent is removed by suction filtration; this is followed by washing 4 times with 3 mL of 0.2 mol/L hydrochloric acid and then repeat washing with 4 mL of pure water; after washing, the height of the bed (carrier part deposited on the column) is measured to calculate the volume of the carboxylated carrier; the carboxylated carrier is taken out, transferred to a 100 mL beaker, suspended in 40 mL of 0.1 mol/L saline, and titrated with a 0.1 mol/L aqueous sodium hydroxide solution using an automatic titrator "COM-1600" (manufactured by Hiranuma Sangyo Co., Ltd.); the ion exchange capacity (meq/L-gel) per 1 L of the carboxylated carrier is calculated from the amount of the titration solution up to the end point; and, the unit is converted into "mmol/L-gel" (1 meq/L-gel = 1 mmol/L-gel).

[0012b] In another aspect, there is provided a purification method for purifying a biological substance by adsorbing and eluting the biological substance as the biological substance passes through a column packed with the affinity chromatography carrier as described herein.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] By a configuration in which the affinity chromatography carrier of the present invention has both an affinity ligand which is at least one selected from the group consisting of

**WHAT IS CLAIMED IS:**

1. An affinity chromatography carrier, comprising:

carboxylated carrier including a substrate and a hydrophilic polymer coating the substrate and introducing a carboxy group thereinto; and

an affinity ligand immobilized into the carboxylated carrier, wherein

the substrate is comprised of at least one selected from the group consisting of a polysaccharide, an acrylate-based polymer, a methacrylate-based polymer and a styrene-based polymer,

the hydrophilic polymer is at least one selected from the group consisting of hydrophilic polysaccharides,

the affinity ligand is at least one selected from the group consisting of an antibody-binding protein and an antibody-binding polypeptide,

a carboxy group is introduced into the affinity chromatography carrier, and

the amount of the carboxy group introduced is 15 mmol/L-gel to 60 mmol/L-gel in terms of ion exchange capacity,

wherein the amount of the carboxy group introduced is measured as described below:

1 g of the carboxylated carrier is suspended in 3 mL of pure water, the resulting suspension is poured into a disposable column having an inner diameter of 15 mm, and the solvent is removed by suction filtration; this is followed by washing 4 times with 3 mL of 0.2 mol/L hydrochloric acid and then repeat washing with 4 mL of pure water; after washing, the height of the bed (carrier part deposited on the column) is measured to calculate the volume of the carboxylated carrier; the carboxylated carrier is taken out, transferred to a 100 mL beaker, suspended in 40 mL of 0.1 mol/L saline, and titrated with a 0.1 mol/L aqueous sodium hydroxide solution using an automatic titrator "COM-1600" (manufactured by Hiranuma Sangyo Co., Ltd.); the ion exchange capacity (meq/L-gel) per 1 L of the carboxylated carrier is calculated from the amount of the titration solution up to the end point; and, the unit is converted into "mmol/L-gel" (1 meq/L-gel = 1 mmol/L-gel).

2. The affinity chromatography carrier according to claim 1, wherein the hydrophilic polymer has an intrinsic viscosity of 0.10 dL/g or more.

3. The affinity chromatography carrier according to claim 1 or 2, wherein the coating

amount of the hydrophilic polymer is 3 mg/g-dry gel to 500 mg/g-dry gel.

4. The affinity chromatography carrier according to any one of claims 1 to 3, wherein the substrate is comprised of at least one selected from the group consisting of a polysaccharide, an acrylate-based polymer and a methacrylate-based polymer.

5. The affinity chromatography carrier according to any one of claims 1 to 4, wherein the hydrophilic polymer is at least one selected from the group consisting of dextran, carboxymethyl dextran and pullulan.

6. The affinity chromatography carrier according to any one of claims 1 to 5, wherein the substrate is a porous particle.

7. The affinity chromatography carrier according to any one of claims 1 to 6, wherein the affinity ligand undergoes an antigen-antibody reaction with an antibody.

8. The affinity chromatography carrier according to any one of claims 1 to 7, wherein the affinity ligand is protein A or a variant thereof.

9. The affinity chromatography carrier according to any one of claims 1 to 8, wherein the substrate is comprised of at least one selected from the group consisting of cellulose, agarose, dextran, chitosan, glucomannan, and a crosslinked polysaccharide obtained by introducing a crosslinked structure thereinto,

the hydrophilic polymer is at least one hydrophilic polysaccharide selected from the group consisting of dextran, carboxymethyl dextran and pullulan,

the intrinsic viscosity of the hydrophilic polysaccharide is 0.12 dL/g to 0.30 dL/g,

the coating amount of the hydrophilic polymer is 10 mg/g-dry gel to 240 mg/g-dry gel,

the amount of the carboxy group introduced is 15 mmol/L-gel to 55 mmol/L-gel in terms of ion exchange capacity,

the affinity ligand is protein A or a variant thereof, and

the amount of the affinity ligand introduced is 0.10 mmol/L-gel to 1.0 mmol/L-gel.

10. The affinity chromatography carrier according to any one of claims 1 to 8, wherein the substrate is comprised of at least one selected from the group consisting of an acrylate-based polymer and a methacrylate-based polymer,

the hydrophilic polymer is at least one hydrophilic polysaccharide selected from the group consisting of dextran, carboxymethyl dextran and pullulan,

the intrinsic viscosity of the hydrophilic polysaccharide is 0.12 dL/g to 0.30 dL/g,

the coating amount of the hydrophilic polymer is 10 mg/g-dry gel to 240 mg/g-dry gel,

the amount of the carboxy group introduced is 15 mmol/L-gel to 55 mmol/L-gel in terms of ion exchange capacity,

the affinity ligand is protein A or a variant thereof, and

the amount of the affinity ligand introduced is 0.10 mmol/L-gel to 1.0 mmol/L-gel.

11. A purification method for purifying a biological substance by adsorbing and eluting the biological substance as the biological substance passes through a column packed with the affinity chromatography carrier according to any one of claims 1 to 10.

12. The purification method according to claim 11, wherein pH in the adsorbing is 5.0 to 9.0.

13. The purification method according to claim 11 or 12, wherein pH in the eluting is 2.0 to 5.0.

14. The purification method according to any one of claims 11 to 13, wherein the biological substance is an antibody or an antibody derivative.