CLAIMS

1. A filler for affinity chromatography, comprising a protein ligand represented by the following formula (1) immobilized on a carrier:

$R-R^2$ ..... (1)

wherein R represents an amino acid sequence consisting of 4 to 300 amino acid residues containing a region of 4 to 20 contiguous histidine residues; and R^2 represents an amino acid sequence capable of binding to immunoglobulin, the amino acid sequence consisting of 50 to 500 amino acid residues containing Z domain of Protein A or a fragment thereof, or a variant thereof, provided that the R binds to C-terminus or N-terminus of the R^2.

2. The filler for affinity chromatography according to claim 1, wherein amino group in the protein ligand represented by the formula (1) is immobilized on the carrier having epoxy group.

3. The filler for affinity chromatography according to claim 2, wherein the carrier comprises a substituted 2,3-dihydroxypropyl group as a ring-opened epoxy group.

4. A method for isolating an immunoglobulin, the method comprising:

adsorbing immunoglobulin to the filler for affinity chromatography according to any one of claims 1 to 3;

eluting the immunoglobulin; and

washing the filler with an alkaline liquid.

The invention claimed is:

1. A filler for affinity chromatography, comprising a protein ligand represented by the following formula (1) immobilized on a carrier:

$R—R^2$ (1),

wherein R represents an amino acid sequence having from 4 to 300 amino acid residues comprising a region of from 4 to 20 contiguous histidine residues; and R^2 represents an amino acid sequence which binds to immunoglobulin, and has from 50 to 500 amino acid residues comprising a Z domain of Protein A or an amino acid sequence having at least 95% identity to the Z domain of Protein A, wherein the amino acid sequence R binds to a C-terminus or N-terminus of the amino acid sequence R^2,

wherein the carrier is at least one synthetic polymer selected from the group consisting of poly(meth)acrylate, poly(meth)acrylamide, and a styrene-divinylbenzene copolymer, and

wherein the protein ligand is bound to an epoxy group carried by the carrier via an amino group in this protein ligand.

2. The filler for affinity chromatography according to claim 1, wherein the carrier comprises a substituted 2,3-dihydroxypropyl group as a ring-opened epoxy group.

3. The filler according to claim 1, wherein the carrier has a mean volume diameter of from 20 μm to 80 μm.

4. The filler according to claim 1, wherein the carrier is porous and has a specific surface area of from 50 m^2/g to 150 m^2/g.

5. The filler according to claim 1, wherein the carrier has a volume average pore size of from 100 nm to 400 nm.

6. A filler for affinity chromatography, comprising a protein ligand represented by the following formula (1) immobilized on a carrier:

$R—R^2$ (1),

wherein R represents an amino acid sequence having from 4 to 300 amino acid residues comprising a region of from 4 to 20 contiguous histidine residues; and R^2 represents an amino acid sequence which binds to immunoglobulin and has from 50 to 500 amino acid residues comprising an amino acid sequence having at least 95% identity to a Z domain of Protein A, wherein the amino acid sequence R binds to a C-terminus or N-terminus of

the amino acid sequence R^2,
wherein the carrier is at least one synthetic polymer selected from the group consisting of poly(meth)acrylate, poly(meth)acrylamide, and a styrene-divinylbenzene copolymer, and
wherein the protein ligand is bound to an epoxy group carried by the carrier via an amino group in this protein ligand.

7. A method for isolating an immunoglobulin, the method comprising:
adsorbing the immunoglobulin to the filler according to claim 1;
eluting the immunoglobulin; and
washing the filler with an alkaline solution.