Claims

1. A separating material for affinity chromatography based on a hydroxyl-containing porous base support, to a surface of which porous base support grafted are polymer chains by covalent bonding via OH groups present on the surface of the base support, comprising

a) a porous base support, which base support has been produced from a medium containing silica, which base support has first been coated with zirconia or titanium oxide, and which base support has been treated with a tri- or more functional epoxide,

b) two or more grafted polymer chains having been initiated from one hydroxyl group present on the surface of the base support, and

c) each grafted polymer chain has multiple reactive groups which are suitable for coupling affinity ligands.

2. The separating material according to claim **1**, wherein the porous base support is a porous ceramic medium.

3. The separating material according to claim **1**, wherein the porous base support is a porous ceramic medium comprising oxides of silicium, zirconium titanium, or a mixture thereof.

4. The separating material according to claim **1**, wherein on the porous base support as a result of the treatment with the tri- or more functional epoxide formed is a crosslinked coating having hydroxyl groups, thereby providing the OH groups on the surface of the base support.

5. The separating material according to claim **1**, wherein the porous base support has been treated with a tri- or more functional epoxide forming a crosslinked coating containing epoxy functionality.

6. The separating material according to claim **1**, comprising the porous base support, wherein the OH groups present on the base support are present in a crosslinked coating containing aliphatic hydroxyl or diol groups to which covalently bound are graft polymer chains comprising acrylic acid or its derivative providing carboxylic acid groups.

7. The separating material according to claim **1**, comprising the porous base support, wherein the OH groups present on the base support are present in a crosslinked coating containing aliphatic hydroxyl or diol groups to which covalently bound are graft polymer chains by surface initiated polymerization of monomers of glycidyl methacrylate, vinyl azlactone, acrylic acid N-hydroxysuccinimide ester, or methacrylic acid N-hydroxysuccinimide ester, providing reactive groups for further functionalization.

8. The separating material according to claim **6**, comprising the porous base support, wherein the OH groups present on the base support are present in a crosslinked coating containing aliphatic hydroxyl or diol groups to which covalently bound are graft polymer chains built from acrylic acid or its derivative and one or more monomers providing carboxylic acid groups, which one or more monomers are selected from the group consisting of maleic acid, acrylic acid, methacrylic acid, carboxyethylmethacrylamide, carboxyethylmethacrylamide, carboxylacrylamide, carboxymethacrylamide, carboxypropylacrylamide, carboxymethylacrylamide, 2-acrylamido-2-methylsulphonic acid, acrylamideethane sulphonic acid, 2-(diethylaminoethyl) acrylamide, 2-(diethylaminoethyl)methacrylamide, 2-(acryloylaminoethyl)-trimethylammonium chloride, 3-(acryloylaminopropyl)-trimethylammonium chloride,

2-(dimethylaminoethyl)methacryl-amide, 2-(dimethylaminoethyl)acrylamide, 2-(diethylaminopropyl)acrylamide, 2-(diethylaminopropyl)methacrylamide, 2-(methacryloylaminoethyl)-trimethylammonium chloride, and 3-(methacryloylaminopropyl)-trimethylammonium chloride and optionally hydrophobic monomers comprising linear or branched alkyl, aryl, alkylaryl, arylalkyl having up to 18 carbon atoms, which optionally contain alkoxy, cyano, carboxy, acetoxy or acetamino groups.

9. The separating material for ion-exchange chromatography according to claim **6**, comprising the porous base support, wherein the OH groups present on the base support are present in a crosslinked coating containing aliphatic hydroxyl or diol groups to which covalently bound are graft polymer chains, which have been made from one or more monomers selected from the group consisting of

maleic acid, acrylic acid, methacrylic acid, carboxyethylmethacrylamide, carboxyethylmethacrylamide, carboxylacrylamide, carboxymethacrylamide, carboxypropylacrylamide, carboxymethylacrylamide, 2-acrylamido-2-methylsulphonic acid, acrylamideethane sulphonic acid,

2-(diethylaminoethyl)acrylamide, 2-(diethylaminoethyl) methacrylamide, 2-(acryloylaminoethyl)-trimethylammonium chloride, 3-(acryloylaminopropyl)-trimethylammonium chloride, 2-(dimethylaminoethyl) methacryl-amide, 2-(dimethylaminoethyl)acrylamide, 2-(diethylaminopropyl)acrylamide, 2-(diethylaminopropyl)methacrylamide, 2-(methacryloylaminoethyl)-trimethylammonium chloride, and 3-(methacryloylaminopropyl)-trimethylammonium chloride,

and optionally

hydrophobic monomers comprising linear or branched alkyl, aryl, alkylaryl, arylalkyl having up to 18 carbon atoms, which optionally contain alkoxy, cyano, carboxy, acetoxy or acetamino groups.

10. The separating material according to claim **1**, wherein each polymer chain has multiple reactive groups suitable for coupling protein A.

11. The separating material according to claim **1**, wherein each polymer chain has multiple reactive groups to at least some of which is coupled protein A.

12. A process for preparing a separating material for affinity chromatography based on a hydroxyl-containing porous base support, to a surface of which porous base support grafted are polymer chains by covalent bonding via OH groups present on the surface of the base support, comprising a) a porous base support, which base support has been produced from a medium containing silica, which base support has first been coated with zirconia or titanium oxide, and which base support has been is treated with a tri- or more functional epoxide, b) two or more grafted polymer chains having been initiated from one hydroxyl group present on the surface of the base support, and c) each grafted polymer chain has multiple reactive groups which are suitable for coupling affinity ligands, and wherein each polymer chain has multiple reactive groups to at least some of which is coupled protein A, said process comprising a) coating the porous silica base support medium with zirconium oxide or titanium oxide and, optionally after treatment with mineral acid, sodium hydroxide or plasma, b) reacting with a tri-functional epoxide, c) graft polymerizing with chains comprising acrylic acid or its derivative providing carboxylic acid groups onto the coating of step b), which contains aliphatic hydroxyl or diol groups, and d) coupling protein A to a reactive group of the grafted polymer chain.

13. A method for the removal of a biopolymer from a liquid medium, comprising removing said biopolymer from said liquid medium by a separating material according to for affinity chromatography based on a hydroxyl-containing porous base support, to a surface of which porous base support grafted arc polymer chains by covalent bonding via OH groups present on the surface of the base support, comprising a) a porous base support, which base support has been produced from a medium containing silica, which base support has first been coated with zirconia or titanium oxide, and which base support has been is treated with a tri- or more functional epoxide, b) two or more grafted polymer chains having been initiated from one hydroxyl group present on the surface of the base support, and c) each grafted polymer chain has multiple reactive groups which are suitable for coupling affinity ligands.

14. The method according to claim **13**, wherein the biopolymer, which has been adsorbed to the separating material by interaction with coupled protein A and/or ionic groups of grafted polymer chains and optionally with hydrophobic groups is desorbed by

a) increasing the ion strength and/or

b) modifying the pH in the solution and/or

c) an eluent having a different polarity to that of the adsorption buffer.

15. A chromatography column, containing a separating material for affinity chromatography based on a hydroxyl-containing porous base support, to a surface of which porous base support grafted are polymer chains by covalent bonding via OH groups present on the surface of the base support, comprising a) a porous base support, which base support has been produced from a medium containing silica, which base support has first been coated with zirconia or titanium oxide, and which base support has been is treated with a tri- or more functional epoxide, b) two or more grafted polymer chains having been initiated from one hydroxyl group present on the surface of the base support, and c) each grafted polymer chain has multiple reactive groups which are suitable for coupling affinity ligands.