

CLAIMS

1. Sorbent comprising a solid support material, the surface of which comprise
 - a first residue comprising a binuclear heteroaromatic structure comprising besides carbon atoms at least one of the heteroatoms N, O, S; and
 - 5 - a second residue comprising a mononuclear hetero- aromatic structure comprising besides carbon atoms at least one of the heteroatoms N, O, S; characterized in that the first and second residue are not directly connected with each other but are separately attached to ~~either the bulk solid support material itself or a polymer film supported by it~~ said bulk solid support as carrier, wherein the polymer comprises or consists of individual chains which are covalently crosslinked with each other, but which are not covalently bound to the surface of the carrier and wherein the polymer is a polyamine, or a polyvinyl amine, or a copolymer or polymer blend comprising a polyamine.
- 15 2. Sorbent of claim 1, wherein the binuclear heteroaromatic structure is a benzopyrrole (indole) structure, including all possible aza-benzopyrrole, oxa-benzopyrrole, and thia-benzopyrrole structures, or a benzopyridine (quinoline or isoquinoline) structure, including all possible aza-benzopyridine, oxa-benzopyridine, and thia-benzopyridine structures.
- 20 3. Sorbent of claim 1 or 2, wherein the mononuclear heteroaromatic structure is pyrrole structure, including all possible aza-pyrrole, oxa-pyrrole, and thia-pyrrole structures such as 3-azapyrrole (imidazole).
- 25 4. Sorbent of any one of the preceding claims, wherein the first and/or second residue comprise(s) a covalent, conformationally flexible linker of a length of from 1 to 20 atoms.
- 30 5. Sorbent of any one of the preceding claims, wherein the surface of the solid support material additionally comprises a third residue and optionally a fourth residue.
6. Sorbent of claim 5, wherein the third residue comprises an amine or amide structure or a primary amine structure.
- 35 7. Sorbent of claim 6, wherein the first, second, and third residue are present in a molar ratio of about 1 : 1 : 2.
8. Sorbent of any one of the preceding claims, wherein the surface of the solid support material is covered with a film of a polymer comprising a first and a

second functional group, which may be the same or which may be different from each other, which in turn carry said first and second, and optionally a third and a fourth residue.

5 | ~~9. Sorbent of claim 8, wherein the polymer comprises or consists of individual chains which are covalently crosslinked with each other, but which are not covalently bound to the surface of the carrier.~~

10 | ~~10. Sorbent of claim 8 or 9, wherein the polymer is a polyamine, or a polyvinyl amine, or a copolymer or polymer blend comprising a polyamine.~~

15 | ~~11. Sorbent of any one of claims 8 to 10~~ claim 8, wherein a first portion of said functional groups of the film of a polymer is crosslinked with at least one crosslinking reagent, and wherein a second portion of said functional groups of the crosslinked polymer are bound to said first and second, and optional further residues.

20 | ~~12. Method for preparing a sorbent as claimed in claim 11~~, comprising:
 (i) providing a polymer having a first and a second functional group
 (ii) adsorbing a film of said polymer onto the surface of a carrier;
 (iii) crosslinking a first portion of said functional groups of the adsorbed polymer with a least one crosslinking reagent;
 (iv) binding a second portion of said functional groups of the crosslinked polymer with said first, second, and optional further residues.

25 | ~~13. Method of separating, or increasing the concentration and/or purity of a protein or peptide from a mixture containing said protein or peptide~~ comprising:

30 | (i) contacting said mixture being dissolved or suspended in a first liquid with a sorbent as claimed in any one of claims 1 to ~~11~~ 9 or with a sorbent prepared according to claim ~~12~~ 10 for a period of time sufficient to enable said protein or peptide to become bound to said sorbent;

(ii) optionally rinsing said sorbent with a second liquid;

35 | (iii) contacting said sorbent with said bound protein or peptide with a third liquid for a period of time sufficient to enable said protein or peptide to become released from said sorbent; wherein the pH of the first liquid is in the range of from 5.5 to 8.5 and the pH of the third liquid is in the range of from 3 to 6.5

40 | (iv) optionally washing and/or regenerating the sorbent with a fourth and/or fifth liquid.

4412. Method of claim 4311, wherein the pH of the first and optionally the second liquid is close to the isoelectric point pI of said protein or peptide.

5 | ~~15. Method of claim 13 or 14, wherein the pH of the first liquid is in the range of from 5.5 to 8.5 and the pH of the third liquid is in the range of from 3 to 6.5.~~

4613. Method of any one of claims 4311 to 4512, wherein said protein or peptide has an isoelectric point pI of from 5.5 to 8.5 and a molecular weight of from 100 to 500,00 Da.