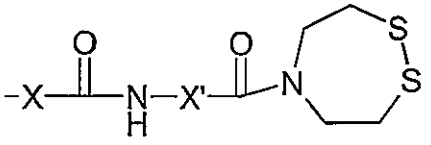
CLAIMS

1. Device for detecting analytes, comprising a plastic substrate at least partly covered directly with bonding polymers fixed to the substrate non-covalently, said bonding polymers comprising a polysaccharide skeleton provided with:
   - aromatic groups of the form -X-CONH-Z, where X represents a linear or branched, substituted or unsubstituted alkyl chain, comprising 1 to 6 carbon atoms, and Z represents an aryl function; and
   - carboxylic acid groups of the form -X-COOH, where X represents a linear or branched, substituted or unsubstituted alkyl chain, comprising 1 to 6 carbon atoms.

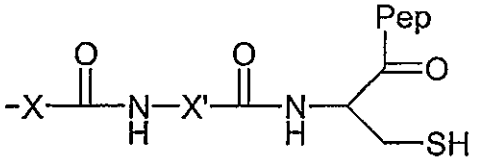
2. Device according to claim 1, in which the polysaccharide skeleton is a dextran skeleton, the molecular weight of which is preferably between 15 000 and 100 000 Da, and more particularly preferably between 30 000 and 60 000 Da.

3. Device according to claim 1 or 2, in which the polysaccharide skeleton is further provided with reactive F groups, said reactive groups preferably being of the form -X-CONH-Z', where X represents a linear or branched, substituted or unsubstituted alkyl chain, comprising 1 to 6 carbon atoms, X being more particularly preferably CH_2, and Z' represents a group that is able to bind to another molecule.

4. Device according to claim 3, in which the reactive F groups are selected from:
   - groups of the form -X-CONH-X'-N_3;
   - groups of the form -X-CONH-NH_2;
   - groups of formula (V):

(V) 

– groups of formula (V'):

(V') 

where X and X' each represent a substituted or unsubstituted alkyl chain comprising from 1 to 6 carbon atoms and Pep represents a peptide fragment.

5. Device according to one of claims 1 to 4, in which:
– X is CH_2; and/or
– Z is -CH_2-Ph or -CH_2-Ph-*para*OH.

6. Device according to one of claims 1 to 5, in which the bonding polymers comprise:
– from 0.4 to 0.8 aromatic groups, preferably from 0.4 to 0.6 aromatic groups, preferably from 0.45 to 0.6 aromatic groups per saccharide unit of the polysaccharide skeleton; and/or
– from 0 to 0.8 reactive groups, preferably from 0 to 0.6 reactive groups, per saccharide unit of the polysaccharide skeleton; and/or
– from 0.5 to 1.5 aromatic, carboxylic acid and reactive groups in total, preferably from 0.9 to 1.3 aromatic, carboxylic acid and reactive groups in total, per saccharide unit of the polysaccharide skeleton.

7. Device according to one of claims 1 to 6, in which the substrate is a substrate of polystyrene, polycarbonate, poly(methyl methacrylate) or polypropylene, and preferably of polystyrene.

8. Device according to one of claims 1 to 7, comprising capturing elements immobilized on the bonding polymers, said capturing elements preferably being immobilized on the bonding polymers by adsorption or by covalent bonding to the reactive F groups.

9. Device according to claim 8, in which the capturing elements are selected from:
- polypeptides, optionally modified and/or conjugated;
- saccharides, oligosaccharides and lipopolysaccharides;
- viruses or virus fragments and cells.

10. Device according to one of claims 1 to 9, comprising a plurality of detection zones, the detection zones preferably comprising different capturing elements.

11. Device according to one of claims 1 to 10, in which the substrate is an opaque or transparent slide, a microtitre plate, a collection of beads, a culture plate, a strip or a stick.

12. Use of a device for detecting analytes according to one of claims 1 to 11, for detecting and optionally quantifying chemical molecules, biological molecules, cells or living organisms.

13. Method of manufacturing a device for detecting analytes according to one of claims 1 to 11, comprising:
- supplying a plastic substrate;
- contacting the substrate with at least one solution comprising bonding polymers.

14. Method according to claim 13, further comprising contacting the substrate with one or more solutions comprising capturing elements.

15. Method of manufacturing a device for detecting analytes according to one of claims 1 to 11, comprising:
- supplying a plastic substrate;
- contacting the substrate with one or more solutions comprising bonding polymers bound to capturing elements.

16. Bonding polymer that can be used in the device according to any one of claims 1 to 11 comprising a polysaccharide skeleton provided with:

- 0.4 to 0.8 aromatic groups per saccharide unit of the form -X-CONH-Z, where X represents a linear or branched, substituted or unsubstituted alkyl chain, comprising 1 to 6 carbon atoms, and Z represents an aryl function;
- carboxylic acid groups of the form -X-COOH, where X represents a linear or branched alkyl chain, comprising 1 to 6 carbon atoms.

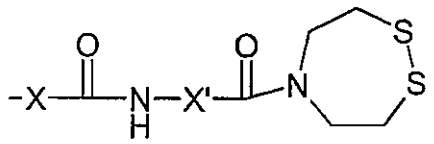
17. Bonding polymer according to the preceding claim, in which the polysaccharide skeleton is a dextran skeleton, the molecular weight of which is preferably between 15 000 and 100 000 Da, and more particularly preferably between 30 000 and 60 000 Da.

18. Bonding polymer according to claim 17 or 18, in which the polysaccharide skeleton is further provided with reactive F groups, said reactive groups preferably being of the form -X-CONH-Z', where X represents a linear or branched, substituted or unsubstituted alkyl chain comprising 1 to 6 carbon atoms, X being more particularly preferably CH_2, and Z' represents a group that is able to bind to another molecule.

19. Bonding polymer according to claim 18, in which the reactive F groups are selected from:

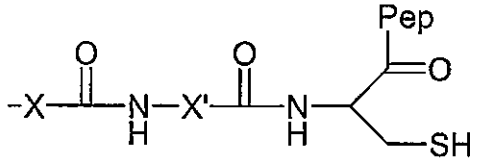
- groups of the form -X-CONH-X'-N_3;
- groups of the form -X-CONH-NH_2;
- groups of formula (V):

(V)



- groups of formula (V'):

(V')



where X and X' each represent a substituted or unsubstituted alkyl chain comprising from 1 to 6 carbon atoms and Pep represents a peptide fragment.

20. Bonding polymer according to one of claims 16 to 19, in which:
- X and/or X' is CH_2; and/or
- X and/or X' is $(CH_2)_2$; and/or
- Z is $-CH_2$-Ph or $-CH_2$-Ph-*para*OH.

21. Bonding polymer according to one of claims 16 to 20, comprising:
- from 0.4 to 0.6 aromatic groups, preferably from 0.45 to 0.6 aromatic groups, per saccharide unit of the polysaccharide skeleton; and/or
- from 0 to 0.8 reactive groups, preferably from 0 to 0.6 reactive groups, per saccharide unit of the polysaccharide skeleton; and/or
- from 0.5 to 1.5 aromatic, carboxylic acid and reactive groups in total, preferably from 0.9 to 1.3 aromatic, carboxylic acid and reactive groups in total, per saccharide unit of the polysaccharide skeleton.

22. Method of manufacturing the bonding polymer according to one of claims 16 to 21, comprising:

- supplying a dextran polysaccharide;
- grafting carboxylic acid groups on the polysaccharide;
- modifying a proportion of the grafted carboxylic acid groups in order to supply aromatic groups;
- optionally modifying a proportion of the carboxylic acid groups in order to supply reactive groups.

CLAIMS

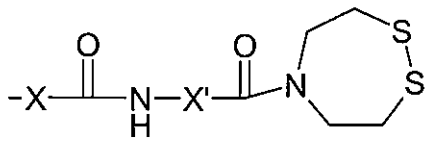
1. Device for detecting analytes, comprising a plastic substrate at least partly covered directly with bonding polymers fixed to the substrate non-covalently, said bonding polymers comprising a polysaccharide skeleton provided with:

- aromatic groups of the form -X-CONH-Z, where X represents a linear or branched, substituted or unsubstituted alkyl chain, comprising 1 to 6 carbon atoms, and Z represents an aryl function; and
- carboxylic acid groups of the form -X-COOH, where X represents a linear or branched, substituted or unsubstituted alkyl chain, comprising 1 to 6 carbon atoms.

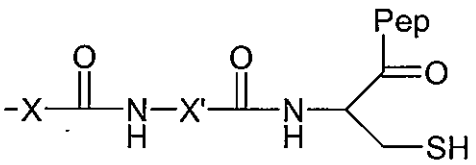
2. Device according to claim 1, in which the polysaccharide skeleton is a dextran skeleton, the molecular weight of which is preferably between 15 000 and 100 000 Da, and more particularly preferably between 30 000 and 60 000 Da.

3. Device according to claim 1 or 2, in which the polysaccharide skeleton is further provided with reactive F groups selected from:

- groups of the form -X-CONH-X'-N_3;
- groups of the form -X-CONH-NH_2;
- groups of formula (V):

(V) 

- groups of formula (V'):

(V') 

where X and X' each represent a substituted or unsubstituted alkyl chain comprising from 1 to 6 carbon atoms and Pep represents a peptide fragment.

4. Device according to one of claims 1 to 3, in which:
- X is CH_2; and/or
- Z is -CH_2-Ph or -CH_2-Ph-*para*OH.

5. Device according to one of claims 1 to 4, in which the bonding polymers comprise:
- from 0.4 to 0.8 aromatic groups, preferably from 0.4 to 0.6 aromatic groups, preferably from 0.45 to 0.6 aromatic groups per saccharide unit of the polysaccharide skeleton; and/or
- from 0 to 0.8 reactive groups, preferably from 0 to 0.6 reactive groups, per saccharide unit of the polysaccharide skeleton; and/or
- from 0.5 to 1.5 aromatic, carboxylic acid and reactive groups in total, preferably from 0.9 to 1.3 aromatic, carboxylic acid and reactive groups in total, per saccharide unit of the polysaccharide skeleton.

6. Device according to one of claims 1 to 5, in which the substrate is a substrate of polystyrene, polycarbonate, poly(methyl methacrylate) or polypropylene, and preferably of polystyrene.

7. Device according to one of claims 1 to 6, comprising capturing elements immobilized on the bonding polymers, said capturing elements preferably being immobilized on the bonding polymers by adsorption or by covalent bonding to the reactive F groups.

8. Device according to claim 7, in which the capturing elements are selected from:
- polypeptides, optionally modified and/or conjugated;
- saccharides, oligosaccharides and lipopolysaccharides;
- viruses or virus fragments and cells.

9. Device according to one of claims 1 to 8, comprising a plurality of detection zones, the detection zones preferably comprising different capturing elements.

10. Device according to one of claims 1 to 9, in which the substrate is an opaque or transparent slide, a microtitre plate, a collection of beads, a culture plate, a strip or a stick.

11. Use of a device for detecting analytes according to one of claims 1 to 10, for detecting and optionally quantifying chemical molecules, biological molecules, cells or living organisms.

12. Method of manufacturing a device for detecting analytes according to one of claims 1 to 10, comprising:

- supplying a plastic substrate;
- contacting the substrate with at least one solution comprising bonding polymers.

13. Method according to claim 12, further comprising contacting the substrate with one or more solutions comprising capturing elements.

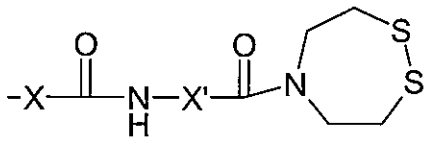
14. Method of manufacturing a device for detecting analytes according to one of claims 1 to 10, comprising:

- supplying a plastic substrate;
- contacting the substrate with one or more solutions comprising bonding polymers bound to capturing elements.

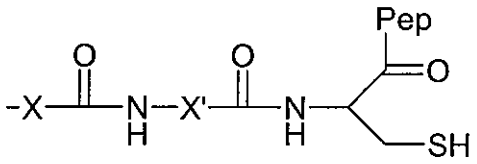
15. Bonding polymer that can be used in the device according to any one of claims 1 to 10 comprising a polysaccharide skeleton provided with:

- 0.4 to 0.8 aromatic groups per saccharide unit of the form -X-CONH-Z, where X represents a linear or branched, substituted or unsubstituted alkyl chain, comprising 1 to 6 carbon atoms, and Z represents an aryl function;
- carboxylic acid groups of the form -X-COOH, where X represents a linear or branched alkyl chain, comprising 1 to 6 carbon atoms,

– reactive F groups, said reactive F groups being selected from:
  – groups of the form -X-CONH-X'-N_3;
  – groups of the form -X-CONH-NH_2;
  – groups of formula (V):

(V) 

  – groups of formula (V'):

(V') 

where X and X' each represent a substituted or unsubstituted alkyl chain comprising from 1 to 6 carbon atoms and Pep represents a peptide fragment.

16. Bonding polymer according to the preceding claim, in which the polysaccharide skeleton is a dextran skeleton, the molecular weight of which is preferably between 15 000 and 100 000 Da, and more particularly preferably between 30 000 and 60 000 Da.

17. Bonding polymer according to one of claims 15 to 16, in which:
  – X and/or X' is CH_2; and/or
  – X and/or X' is $(CH_2)_2$; and/or
  – Z is $–CH_2$-Ph or $–CH_2$-Ph-*para*OH.

18. Bonding polymer according to one of claims 15 to 17, comprising:
  – from 0.4 to 0.6 aromatic groups, preferably from 0.45 to 0.6 aromatic groups, per saccharide unit of the polysaccharide skeleton; and/or

- up to 0.8 reactive groups, preferably up to 0.6 reactive groups, per saccharide unit of the polysaccharide skeleton; and/or
- from 0.5 to 1.5 aromatic, carboxylic acid and reactive groups in total, preferably from 0.9 to 1.3 aromatic, carboxylic acid and reactive groups in total, per saccharide unit of the polysaccharide skeleton.

19. Method of manufacturing the bonding polymer according to one of claims 15 to 18, comprising:

- supplying a dextran polysaccharide;
- grafting carboxylic acid groups on the polysaccharide;
- modifying a proportion of the grafted carboxylic acid groups in order to supply aromatic groups;
- modifying a proportion of the carboxylic acid groups in order to supply reactive groups.