Claims

1. An aqueous polyorganosiloxane hybrid resin dispersion, comprising:
   - at least one polyorganosiloxane hybrid resin comprising a reaction product of a composition comprising component (A): 5 to 95 parts by weight of one or more polyorganosiloxanes of the general formula

     $R_aSi(OR')_bO_{(4-a-b/2)}$ Formula (I)

     with $0<a<2$, $0<b<2$ and $a+b<4$,

     optionally, component (B): 0-20 parts by weight of one or more linear polyorganosiloxanes of the formula

     $R''O-[R'''_2Si-O]_n-R''$ Formula (II), and

     component (C): 5 to 95 parts by weight of an organic polymer which is a polyester, wherein
     R_a, R', R'' and R''' are each independently an alkyl radical having 1 to 8 carbon atoms or an aromatic radical having 6 to 20 carbon atoms and n is a number in the range from 4 to 250,
   - at least one amphiphilic emulsifier, wherein the emulsifier has an HLB value of 9 to 19 and is a triblock copolymer having a middle block of polypropylene oxide and two terminal blocks of polyethylene oxide or mixtures thereof, and
   - water.

~~2. Polyorganosiloxane hybrid resin dispersion according to Claim 1, characterized in that the polyorganosiloxane hybrid resin is an organic polymer-modified polyorganosiloxane.~~

~~3. Polyorganosiloxane hybrid resin dispersion according to Claim 1 or 2, characterized in that the polyorganosiloxane hybrid resin comprises reaction products of a composition comprising~~

~~- component A) 5 to 95 parts by weight, preferably 10 to 70 parts by weight, of one or more polyorganosiloxanes of the general formula~~

$R_aSi(OR')_bO_{(4-a-b/2)}$ Formula (I)

with 0<a<2, 0<b<2 and a+b<4,

- optionally component B) 0-20 parts by weight, preferably 1-10 parts by weight, of one or more linear and/or branched polyorganosiloxanes of the formula

$R''O-[R'''_2Si-O]_n-R''$ Formula (II)

- component C) 5 to 95 parts by weight, preferably 30 to 90 parts by weight, of an organic polymer,

where

R_a, R', R'' and R''' are each independently an alkyl radical having 1 to 8 carbon atoms or an aromatic radical having 6 to 20 carbon atoms and n is a number in the range from 4 to 250.

4. Polyorganosiloxane hybrid resin dispersion according to Claim 3, characterized in that the organic polymer is selected from the group of the polyepoxides, polyesters, polyacrylates and/or methacrylates and copolymers thereof, polyurethanes, cellulose derivatives, polysulfones, polyether sulfones, polyphenylene sulfides and oxides, polyamides, polyamide imide, polyimides, polyethers, aromatic and aliphatic glycidyl-functional polymers, oligomers, phenoxy resins, polycarbonates, ketone-formaldehyde resins, polyvinyl resins selected from polyvinyl alcohol, polyglycerols, polyvinylacetate, (partial) hydrolysates and derivatives thereof, phenolic resins, fluoropolymers, alkyd resins and mixtures thereof.

52. The Ppolyorganosiloxane hybrid resin dispersion according to cClaim 41, characterized in thatwherein the organic polymer containscomprises a hydroxyl groups and/or acidic hydrogen.

6. Polyorganosiloxane hybrid resin dispersion according to any of Claims 1-5, characterized in that the emulsifiers are block copolymers having one or more hydrophobic units and having one or more hydrophilic units, where the hydrophobic unit preferably consists of polypropylene oxide, organically modified polypropylene oxide or polybutylene oxide and the hydrophilic units consist of polyethylene oxide.

~~7. Polyorganosiloxane hybrid resin dispersion according to Claim 6, characterized in that the emulsifier has an HLB value of 9 to 19, preferably an HLB value of 11 to 17.~~

~~8. Polyorganosiloxane hybrid resin dispersion according to Claim 7, characterized in that the emulsifiers are triblock copolymers having a middle block of polypropylene oxide and two terminal blocks of polyethylene oxide or mixtures thereof.~~

~~9~~3. The ~~P~~polyorganosiloxane hybrid resin dispersion according to ~~any of the preceding~~ claim~~s~~ 1, ~~characterized in that~~wherein ~~the~~a residual solvent content is < 5.0% by weight~~, preferably < 2.5% by weight, more preferably < 1.0% by weight,~~ based on the polysiloxane hybrid resin dispersion.

~~10~~4. The ~~P~~polyorganosiloxane hybrid resin dispersion according to ~~any of the preceding~~ claim~~s~~ 1, ~~characterized in that it includes~~ further comprising an additive~~s~~ selected from the group consisting of defoamers, deaerating agents, rheology additives, preservatives, substrate wetting agents, crosslinkers, drying aids, catalysts, antioxidants, anti-skinning agents, anti-settling agents, thickeners, coalescing agents, film-forming aids, fillers, pigments~~, and/or~~ dispersants and mixtures thereof.

~~11~~5. The ~~P~~polyorganosiloxane hybrid resin dispersion according to ~~C~~claim ~~11~~4, ~~characterized in that~~wherein the preservatives used are fungicides, bactericides, pesticides, algicides and/or herbicides.

~~12~~6. The ~~P~~polyorganosiloxane hybrid resin dispersion according to ~~any of the preceding~~ claim~~s~~ 1, ~~characterized in that~~wherein ~~the~~an average volume-weighted diameter of the polyorganosiloxane hybrid resin particles, measured according to ISO 13320:2009~~,~~ is between 0.1-10.0 µm~~, between 0.1-2.0 µm, preferably between 0.2-1.0 µm and more preferably between 0.2-0.7 µm~~.

~~13~~7. The ~~P~~polyorganosiloxane hybrid resin dispersion according to ~~any of the preceding~~ claim~~s~~ 1, ~~characterized in that it~~which has a solids content of 30% by weight-70% by weight~~, preferably 45% by weight-55% by weight~~, based on the dispersion.

~~14~~8. A ~~P~~process for preparing aqueous polyorganosiloxane hybrid resin dispersion according to c~~C~~laim 1, comprising~~: the steps of~~

- emulsifying a polyorganosiloxane hybrid resin solution comprising an organic solvent with at least one emulsifier or an emulsifier system,

- adding water, and
- removing the solvent.

159. The Pprocess for preparing aqueous polyorganosiloxane hybrid resin dispersion according to Cclaim 148, characterized in thatwherein an aqueous emulsifier solution or an aqueous emulsifier system solution is used, wherein the conductivity thereof, measured to DIN 53779, is between 10-25 000 µS cm^{-1}, preferably between 50-5000 µS cm^{-1} and more preferably between 200-2500 µS cm^{-1}.

1610. The Pprocess for preparing aqueous polyorganosiloxane hybrid resin dispersion according to Cclaim 159, characterized in thatwherein the conductivity of the aqueous emulsifier solution or the aqueous emulsifier system solution is adjusted.

17. Process according to Claim 14, characterized in that the polyorganosiloxane hybrid resin comprises reaction products of a composition comprising

- component A) 5 to 95 parts by weight, preferably 10 to 70 parts by weight, of one or more polyorganosiloxanes of the general formula

$$R_aSi(OR')_bO_{(4-a-b/2)} \qquad \text{Formula (I)}$$

with 0<a<2, 0<b<2 and a+b<4,

- optionally component B) 0-20 parts by weight, preferably 1-10 parts by weight, of one or more linear and/or branched polyorganosiloxanes of the formula

$$R''O-[R'''_2Si-O]_n-R'' \qquad \text{Formula (II)}$$

- component C) 5 to 95 parts by weight, preferably 30 to 90 parts by weight, of an organic polymer,

where

R_a, R', R'' and R''' are each independently an alkyl radical having 1 to 8 carbon atoms or an aromatic radical having 6 to 20 carbon atoms and n is a number in the range from 4 to 250.

18. Process according to Claim 14, characterized in that the organic polymer comprises organic polymers containing hydroxyl groups, preferably selected from the group of the

~~polyepoxides, polyesters, polyacrylates and/or methacrylates and copolymers thereof, polyurethanes, cellulose derivatives, polysulfones, polyether sulfones, polyphenylene sulfides and oxides, polyamides, polyamide imide, polyimides, polyethers, aromatic and aliphatic glycidyl-functional polymers, oligomers, phenoxy resins, polycarbonates, ketone-formaldehyde resins, polyvinyl resins selected from polyvinyl alcohol, polyglycerols, polyvinylacetate, (partial) hydrolysates and derivatives thereof, phenolic resins, fluoropolymers, alkyd resins and mixtures thereof.~~

~~19. Process according to Claim 14, characterized in that the emulsifiers are block copolymers having one or more hydrophobic units and having one or more hydrophilic units, where the hydrophobic unit preferably consists of polypropylene oxide, organically modified polypropylene oxide or polybutylene oxide and the hydrophilic units consist of polyethylene oxide.~~

~~20. Process according to Claim 19, characterized in that the emulsifier or emulsifier system has an HLB value of 9 to 19, preferably an HLB value of 11 to 17.~~

~~21. Process according to Claim 20, characterized in that the emulsifiers or emulsifier system comprise(s) triblock copolymers having a middle block of polypropylene oxide and two terminal blocks of polyethylene oxide or mixtures thereof.~~

~~22. Process according to Claim 14, characterized in that the solvent is an organic solvent or a mixture of organic solvents that has been used in the preparation of the polyorganosiloxane hybrid resin.~~

~~23~~11. ~~The P~~process according to ~~C~~claim ~~22~~8, ~~characterized in that~~wherein the organic solvent or mixture thereof has a boiling point range of 50°C-150°C~~, preferably 90°C-120°C~~.

~~24. Process according to Claim 14, characterized in that the solvent is removed by means of distillation under reduced pressure with or without stripping gas, steam distillation, or by means of a membrane process, a thin-film evaporator or a countercurrent exchange process.~~

~~25~~12. ~~The P~~process according to ~~C~~claim ~~14~~8, ~~characterized in that~~wherein the polyorganosiloxane hybrid resin solution has a polyorganosiloxane hybrid resin

concentration of 40.0% by weight-95.0% by weight, ~~, preferably 60.0% by weight-70.0% by weight,~~ based on the polyorganosiloxane hybrid resin solution.

13~~26~~. ~~Use of the polyorganosiloxane hybrid resin dispersion according to any of Claims 1-13 in c~~Coating materials, ~~and also~~ coatings, ~~and~~ paints, substrate coatings, semifinished products, adhesives, inks, sealants, compounding matrices ~~and~~or sizes, comprising:

the polyorganosiloxane hybrid resin dispersion according to claim 1.

14~~27~~. A ~~S~~substrate ~~s, especially baking trays, baking tins, pans, metal pots and the like,~~ coated with a composition comprising a dispersion according to ~~any of C~~claim~~s~~ 1 ~~to 13~~.