

Claims

1. A two-component system for producing a silver-containing aqueous ink formulation for production of electrically conductive structures, which is ~~provided in the form of a one- or two-component system~~ composed of
 - 5 -a separate vehicle component A at least comprising an organic solvent, additives and water and
 - a silver nanoparticle sol as separate component B, at least comprising a liquid dispersant and electrostatically stabilized silver nanoparticles, wherein the liquid dispersant is water or a mixture comprising water and organic solvents,
 - 10 and wherein the ink formulation composed of components A and B comprises at least
 - a) 1 – 50% by weight of organic solvent,
 - b) 0.005 – 12% by weight of additives, and
 - c) 40 – 70% by weight of water,
 - 15 and
 - d) 15-50% by weight of electrostatically stabilized silver nanoparticles,where the sum of the total proportions in the ink formulation adds up to 100% by weight in each case.
2. The two-component system~~ink formulation~~ as claimed in claim 1, characterized in that the silver nanoparticles are stabilized with a di- or tricarboxylic acid having up to 5 carbon atoms or a salt thereof as an electrostatic dispersion stabilizer.
3. The two-component system~~ink formulation~~ as claimed in claim 1 or 2, characterized in that citric acid or a citrate is used for electrostatic stabilization of the silver nanoparticles.
- 25 4. The two-component system~~ink formulation~~ as claimed in at least one of claims 1 to 3, characterized in that ~~the ink formulation~~ comprises at least one nonionic surfactant as an additive and the at least one nonionic surfactant is selected from alkylphenyl polyethylene oxides, polyethylene oxide block copolymers, acetylenic polyethylene oxides, polyethylene oxide esters, polyethylene oxide diesters,
30 polyethylene oxide amines, polyethylene oxide amides and dimethicone copolyols.

5. The ~~two-component system~~ink formulation as claimed in at least one of claims 1 to 4, characterized in that ~~the ink formulation~~ comprises at least one ionic surfactant as an additive and the at least one ionic surfactant is selected from sulfonate-based surfactants, phosphonate-based surfactants and carboxylates.
- 5 6. The ~~two-component system~~ink formulation as claimed in at least one of claims 1 to 5, characterized in that ~~the ink formulation~~ comprises at least one binder and the binder is polyvinylpyrrolidone (PVP).
7. The ~~two-component system~~ink formulation as claimed in at least one of claims 1 to 6, characterized in that ~~the ink formulation~~ comprises at least one wetting agent and the at least one wetting agent is a nonionic surfactant.
- 10 8. The ~~two-component system~~ink formulation as claimed in at least one of claims 1 to 7, characterized in that the surface tension of the ink formulation is ≥ 20 mN/m to ≤ 70 mN/m.
9. The ~~two-component system~~ink formulation as claimed in at least one of claims 15 1 to 8, characterized in that the viscosity of the ink formulation is within a range between ≥ 1 mPa s and ≤ 100 mPa s.
10. A process for producing the ink formulation as claimed in at least one of claims 1 to 9, characterized in that the two components
- vehicle component A at least comprising an organic solvent, additives and
 - 20 water and
 - a silver nanoparticle sol as component B, at least comprising a liquid dispersant and electrostatically stabilized silver nanoparticles, wherein the liquid dispersant is water or a mixture comprising water and organic solvents,
- are produced separately and then combined, such that the ink formulation thus
- 25 obtained comprises at least
- a) 1 – 50% by weight of organic solvent,
 - b) 0.005 – 12% by weight of additives, and
 - c) 40 – 70% by weight of water,
- and
- 30 d) 15-50% by weight of electrostatically stabilized silver nanoparticles,

where the sum of the total proportions in the ink formulation adds up to 100% by weight in each case.

11. A process for producing electrically conductive structures and/or coatings on a substrate, characterized by the steps of

5 A) providing a substrate,

B) producing an ink formulation according to the process of claim 10,

B)C) applying the ink formulation as claimed in at least one of claims 1 to 9 by means of printing, especially by means of inkjet printing, to at least one surface of the substrate, and

10 C)D) heat-treating the printed substrate.

12. The process as claimed in claim 11, characterized in that the heat treatment is performed at at least one temperature within a temperature range of 40°C to 180°C.

13. The process as claimed in claim 11 or 12, characterized in that the heat
15 treatment is performed over a period of 5 minutes to 1 hour.

14. An electrically conductive structure and/or coating on a substrate, obtainable from an ink formulation as claimed in any of claims 1 to 9, especially by means of a printing method.

15. The use of an ink formulation as claimed in any of claims 1 to 9 as an ink for
20 inkjet printers and/or for production of electrically conductive structures and/or electrically conductive coatings.