

CLAIMS

1. A reactive ink for ink jet printing comprising a two-component system, the
5 first component comprising a polymerizable monomer, and the second
component comprising a polymerization catalyst, wherein the monomer is able
to form a polymeric film at low temperature within thirty minutes from contacting
the catalyst.
- 10 2. The reactive ink for ink jet printing according to claim 1, wherein said
monomer is able to form a polymeric film at low temperature within ten minutes
from contacting the catalyst.
3. The reactive ink for ink jet printing according to claim 1, wherein said
15 monomer is able to form a polymeric film at low temperature within one minute
from contacting the catalyst.
4. The reactive ink for ink jet printing according to any one of claims 1 to 3,
wherein said monomer is able to form a polymeric film at a temperature equal to
20 or lower than 60°C.
5. The reactive ink for ink jet printing according to any one of claims 1 to 3,
wherein said monomer is able to form a polymeric film at a temperature equal to
or lower than 40°C.
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6. The reactive ink for ink jet printing according to any one of claims 1 to 3,
wherein said monomer is able to form a polymeric film at a temperature ranging
from 10° to 30°C.
- 30 7. The reactive ink for ink jet printing according to any one of preceding
claims, wherein said polymerizable monomer is selected from the group
consisting of aliphatic epoxy monomers, alicyclic epoxy monomers, aromatic
epoxy monomers, and mixtures thereof.
- 35 8. The reactive ink for ink jet printing according to claim 7, wherein said

aliphatic epoxy monomer is selected from the group consisting of epoxy monomers bearing a C₄-C₂₀ aliphatic group, polyglycol group, and mixtures thereof.

5 9. The reactive ink for ink jet printing according to claim 7, wherein said aliphatic epoxy monomer is selected from the group consisting of butadiene dioxide, dimethylpentane dioxide, diglycidyl ether, 1,4-butanedioldiglycidyl ether, diethylene glycol diglycidyl ether, dipentene dioxide, and mixtures thereof.

10 10. The reactive ink for ink jet printing according to claim 7, wherein said alicyclic epoxy monomer is selected from the group consisting of (3'-4'-Epoxy cyclohexane)methyl 3'-4'-Epoxy cyclohexyl-carboxylate, 2-(3,4-epoxy)-cyclohexyl-5,5-spiro-(3,4-epoxy) cyclohexane-m-dioxane, 3,4-epoxycyclohexyl-alkyl-3,4-epoxy cyclohexanecarboxylate, 3,4-epoxy-6-methylcyclohexylmethyl-
15 3,4-epoxy-6-methylcyclohexanecarboxylate, vinyl cyclohexanedioxide, bis(3,4-epoxycyclohexylmethyl) adipate, bis(3,4-epoxy-6-methylcyclohexylmethyl) adipate, exo-exo bis(2,3-epoxycyclopentyl)ether, endo-exo bis(2,3-epoxy-cyclopentyl)ether, 2,2-bis(4-(2,3-epoxypropoxy)cyclohexyl) propane, 2,6-bis(2,3-epoxypropoxycyclohexyl-p-dioxane), 2,6-bis(2,3-epoxypropoxy) norbornene, the
20 diglycidylether of linoleic acid dimer, limonene dioxide, 2,2-bis(3,4-epoxycyclohexyl)propane, dicyclopentadiene dioxide, 1,2-epoxy-6-(2,3-epoxy-propoxy)hexahydro-4,7-methanoindane, p-(2,3-epoxy) cyclopentylphenyl-2,3-epoxypropylether, 1-(2,3-epoxypropoxy)phenyl-5,6-epoxyhexahydro-4,7-methano indane, o-(2,3-epoxy) cyclopentylphenyl-2,3-epoxypropyl ether, 1,2-
25 bis(5-(1,2-epoxy)-4,7-hexahydro-methanoindanoxyl) ethane, cyclopentenylphenyl glycidyl ether, cyclohexanediol diglycidyl ether, diglycidyl hexahydrophthalate, and mixtures thereof.

30 11. The reactive ink for ink jet printing according to claim 10, wherein said alicyclic epoxy monomer is (3'-4'-Epoxy cyclohexane)methyl 3'-4'-epoxycyclohexylcarboxylate.

35 12. The reactive ink for ink jet printing according to claim 7, wherein said aromatic epoxy monomer is selected from the group consisting of bisphenol-A epoxy resins, bisphenol-F epoxy resins, phenol novolac epoxy resins, cresol-

novolac epoxy resins, biphenol epoxy resins, biphenyl epoxy resins, 4,4'-biphenyl epoxy resins, polyfunctional epoxy resins, divinylbenzene dioxide, and 2-glycidylphenylglycidyl ether, and mixtures thereof.

5 13. The reactive ink for ink jet printing according to claim 12, wherein said aromatic epoxy monomer is selected from the group consisting of diglycidyl ether of bisphenol-F (DGEBF) and diglycidyl ether of bisphenol-A (DGEBA), and mixtures thereof.

10 14. The reactive ink for ink jet printing according to claim 1, wherein said polymerization catalyst is a compound able to promote the acid (cationic) polymerization of the said polymerizable monomer.

15 15. The reactive ink for ink jet printing according to claim 14, wherein said polymerization catalyst is selected from the group consisting of Lewis and Bronsted acids having a pKa equal to or lower than 4.

20 16. The reactive ink for ink jet printing according to claim 15, wherein said polymerization catalyst is selected from the group consisting of mineral acids, organic sulfonic acids, superacids, and mixtures thereof.

25 17. The reactive ink for ink jet printing according to claim 16, wherein said mineral acid is selected from the group consisting of sulfuric acid, hydrochloric acid, perchloric acid, nitric acid, phosphoric acid, and mixtures thereof.

30 18. The reactive ink for ink jet printing according to claim 16, wherein said organic sulfonic acid is selected from the group consisting of methanesulfonic acid, trifluoromethanesulfonic acid, benzenesulfonic acid, dodecylbenzenesulfonic acid, dodecyl diphenyl oxide sulfonic acid, 5-methyl-1-naphthylsulfonic acid, p-toluenesulfonic acid, and mixtures thereof.

35 19. The reactive ink for ink jet printing according to claim 16, wherein said superacid is selected from the group consisting of perchloric acid, fluorosulfuric acid, trifluoromethanesulfonic acid, perfluoroalkylsulfonic acids., SbF₅, TaF₅, NbF₅, PF₅, BF₃, HSbF₆, HTaF₆, HNbF₆, HPF₆, HBF₄, and mixtures thereof.

20. The reactive ink for ink jet printing according to claim 14, wherein said polymerization catalyst is selected from the group consisting of perchloric acid, orthophosphoric acid, trifluoromethanesulfonic acid, tetrafluoroboric (HBF₄),
5 hexafluoroantimonic acid (HSbF₆), and mixtures thereof.

21. The reactive ink for ink jet printing according to any one of preceding claims, wherein said first component and said second component are mixed in an amount so as to provide a weight ratio between said polymerizable monomer
10 and said polymerization catalyst ranging from 1:1 to 1:10.

22. The reactive ink for ink jet printing according to claim 21, wherein said weight ratio ranges from 1:1 to 1:5.

15 23. The reactive ink for ink jet printing according to claim 21, wherein said weight ratio ranges from 1:1 to 1:3.

24. The reactive ink for ink jet printing according to any one of preceding claims, wherein said first component and said second component further
20 comprises at least one carrier medium.

25. The reactive ink for ink jet printing according to claim 24, wherein said carrier medium is selected from the group consisting of alcohols, water, amides, carboxylic acids, esters, ethers, glycerine, glycols, glycol esters, glycol ethers,
25 ketones, lactams, lactones, sulfones, organosulfoxides, and mixtures thereof.

26. The reactive ink for ink jet printing according to claim 25, wherein said carrier medium is selected from the group consisting of ethyl alcohol, methyl alcohol, isopropyl alcohol, n-propyl alcohol, water and mixture thereof.
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27. The reactive ink for ink jet printing according to any one of preceding claims, wherein said first component and said second component further comprises at least one component selected from the group consisting of colorants, surfactants, defoamers, sequestering agents, and biocides.
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28. A process of making an image on a non-porous substrate, the process comprising jetting a reactive ink composition onto said non-porous substrate, wherein said reactive ink composition comprises a first component comprising a polymerizable monomer, and a second component comprising a polymerization catalyst, wherein the monomer is able to form a polymeric film at low temperature within thirty minutes from contacting the catalyst.

29. The process according to claim 28, wherein said first component is jetted separately from said second component.

30. The process according to claim 29, wherein said first component is jetted simultaneously with said second component.

31. The process according to claim 29, wherein said first component is jetted after the jetting of said second component.

32. The process according to claim 29, wherein said first component is jetted before the jetting of said second component.

33. The process according to any one of preceding claims 28 to 32, wherein said polymerizable monomer has the features as defined in any of claims 2 to 13.

34. The process according to any one of preceding claims 28 to 32, wherein said polymerization catalyst has the features as defined in any of claims 14 to 20.

35. The process according to any one of preceding claims 28 to 32, wherein said first component and said second component have the features as defined in any of claims 21 to 27.

36. An ink jet print head including a two component ink-system, comprising a first tank including a first ink component comprising a polymerizable monomer, a second tank including a second ink component comprising a polymerization catalyst, and separate ejection systems for the first and second ink components.

CLAIMS

1. A reactive ink for ink jet printing comprising a two-component system, the
5 first component comprising a polymerizable monomer, and the second
component comprising a polymerization catalyst, wherein the polymerizable
monomer is able to form a polymeric film at a temperature equal to or lower than
60°C within thirty minutes from contacting the catalyst, and wherein said first
10 component and said second component are mixed in an amount so as to provide
a weight ratio between said polymerizable monomer and said polymerization
catalyst ranging from 1:1 to 1:10.

2. The reactive ink for ink jet printing according to claim 1, wherein said
polymerizable monomer is able to form a polymeric film at low temperature within
15 ten minutes from contacting the catalyst.

3. The reactive ink for ink jet printing according to claim 1, wherein said
polymerizable monomer is able to form a polymeric film at low temperature within
one minute from contacting the catalyst.
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4. The reactive ink for ink jet printing according to any one of claims 1 to 3,
wherein said polymerizable monomer is able to form a polymeric film at a
temperature equal to or lower than 40°C.

25 5. The reactive ink for ink jet printing according to any one of claims 1 to 3,
wherein said polymerizable monomer is able to form a polymeric film at a
temperature ranging from 10° to 30°C.

6. The reactive ink for ink jet printing according to any one of preceding
30 claims, wherein said polymerizable monomer is selected from the group
consisting of aliphatic epoxy monomers, alicyclic epoxy monomers, aromatic
epoxy monomers, and mixtures thereof.

7. The reactive ink for ink jet printing according to claim 1, wherein said
35 polymerization catalyst is a compound able to promote the acid (cationic)

polymerization of the said polymerizable monomer.

8. The reactive ink for ink jet printing according to claim 7, wherein said polymerization catalyst is selected from the group consisting of Lewis and
5 Bronsted acids having a pKa equal to or lower than 4.

9. The reactive ink for ink jet printing according to claim 9, wherein said polymerization catalyst is selected from the group consisting of mineral acids, organic sulfonic acids, superacids, and mixtures thereof.
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10. The reactive ink for ink jet printing according to claim 1, wherein said weight ratio ranges from 1:1 to 1:5.

11. The reactive ink for ink jet printing according to claim 1, wherein said
15 weight ratio ranges from 1:1 to 1:3.

12. The reactive ink for ink jet printing according to any one of preceding claims, wherein said first component and said second component further comprises at least one carrier medium.
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13. The reactive ink for ink jet printing according to any one of preceding claims, wherein said first component and said second component further comprises at least one component selected from the group consisting of colorants, surfactants, defoamers, sequestering agents, and biocides.
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14. A process of making an image on a non-porous substrate, the process comprising jetting a reactive ink composition onto said non-porous substrate, wherein said reactive ink composition comprises a first component comprising a polymerizable monomer, and a second component comprising a polymerization
30 catalyst, wherein the polymerizable monomer is able to form a polymeric film at a temperature equal to or lower than 60°C within thirty minutes from contacting the catalyst, and wherein said first component and said second component are mixed in an amount so as to provide a weight ratio between said polymerizable monomer and said polymerization catalyst ranging from 1:1 to 1:10.
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15. The process according to claim 14, wherein said first component is jetted separately from said second component.

5 16. The process according to claim 15, wherein said first component is jetted simultaneously with said second component.

17. The process according to claim 15, wherein said first component is jetted after the jetting of said second component.

10 18. The process according to claim 15, wherein said first component is jetted before the jetting of said second component.

15 19. The process according to any one of preceding claims 14 to 18, wherein said polymerizable monomer has the features as defined in any of claims 2 to 6.

20. The process according to any one of preceding claims 14 to 18, wherein said polymerization catalyst has the features as defined in any of claims 7 to 9.

20 21. An ink jet print head including a two component ink-system, comprising a first tank including a first ink component comprising a polymerizable monomer, a second tank including a second ink component comprising a polymerization catalyst, and separate ejection systems for the first and second ink components.