medium which may result in a change of the surface tension of both the medium and the ink, thus influencing the difference between the surface tension of the ink and the surface tension of the medium.

[0190] Generally apolar cosolvents have a low surface tension, while polar cosolvents have a relative high surface tension. Surfactants selected to reduce the surface tension of the ink compositions according to the present invention, are usually capable of reducing the surface tension of an aqueous system. Upon drying of printed ink dots, the aqueous ink system however more and more turns into an organic solvent system. Said selected surfactants are less suitable for reducing the surface tension of an organic solvent system. Therefore, upon drying the surface tension of the printed ink dots increases, increasing the risk of puddling and dewetting. The mixture of surfactants according to this embodiment comprises a first surfactant that is capable of reducing the surface tension (static and dynamic) of the total ink composition, being a surfactant that works well with water. In the context of the present invention the first surfactant comprises a surfactant of the first type and/or of the third type. The mixture of surfactants according to this embodiment comprises a second surfactant that is capable of reducing the surface tension of the drying ink composition, being a surfactant that works well with the polar cosolvent. In the context of the present invention the second surfactant comprises a surfactant of the second type.

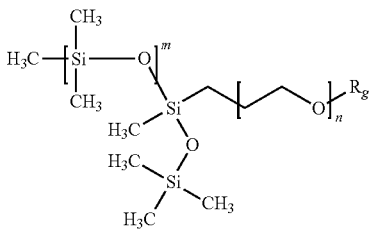
[0191] In an embodiment, the first surfactant of the mixture of surfactants is selected from the group consisting of dialkyl sulfosuccinate salts (surfactant of the third type), such as sodium dioctyl sulfosuccinate (AOT) and an ethoxylated acetylene glycol (surfactant of the first type), such as ethoxylated 2,4,7,9-tetramethyl-5-decyne-4,7-diol and ethoxylated 2,5,8,11-tetramethyl-6-dodecyne-5,8-diol (Dynol™) or a combination thereof.

[0192] In an embodiment, the first surfactant of the mixture of surfactants is selected from the group consisting of dialkyl sulfosuccinate salts (surfactant of the third type) and ethoxylated dodecynes (surfactant of the second type) or a combination of both.

[0193] In an embodiment, the first surfactant is selected from sodium dioctyl sulfosuccinate (AOT; surfactant of the third type) and ethoxylated 2,5,8,11-tetramethyl-6-dodecyne-5,8-diol (surfactant of the second type), being Dynol 607 or a combination of both.

[0194] In an embodiment, the second surfactant is a silicone surfactant (surfactant of the second type), in particular an ethoxylated siloxane surfactant, having a general formula as shown in Formula 4.

Formula 4



wherein m is an integer ranging from 1-25, preferably from 1-20, more preferably from 2-15 and wherein n is an integer ranging from 1-10, preferably from 1-8, more preferably from 1-5.

[0195] In an embodiment, the number average molar weight (M_n) of the ethoxylated siloxane used as a surfactant in an ink composition according to the present invention lies in a range of between 300 g/mol and 1000 gr/mol, preferably between 350 gr/mol and 950 gr/mol, more preferably between 450 gr/mol and 850 gr/mol.

[0196] In an embodiment, the weight average molar weight (M_w) of the ethoxylated siloxane used as a surfactant in an ink composition according to the present invention lies in a range of between 600 g/mol and 1600 gr/mol, preferably between 700 gr/mol and 1500 gr/mol, more preferably between 800 gr/mol and 1400 gr/mol

[0197] In an embodiment, the polydispersity factor ($D=M_w/M_a$) of the ethoxylated siloxane used as a surfactant in an ink composition according to the present invention lies in a range of between 1 and 2, preferably between 1 and 1.95, more preferably between 1.3 and 1.9.

[0198] In an embodiment, the second surfactant is an ethoxylated siloxane surfactant selected from the group consisting of BYK 348, BYK 349, Silwet L-77 and Tegowet 240. Structural properties of these surfactants are shown in Table 2 with reference to Formula 4. In particular, BYK 349 has shown to be suitable for the purpose of this embodiment.

[0199] In an embodiment, the first surfactant is selected from the group consisting of dialkyl sulfosuccinate salts (surfactant of the third type) and ethoxylated dodecynes (surfactant of the first type) or a combination of both and the second surfactant is an ethoxylated siloxane surfactant (surfactant of the second type) preferably selected from the group consisting of BYK 348, BYK 349, Silwet L-77 and Tegowet 240.

[0200] Inventors have found that surfactant mixtures comprising an ethoxylated dodecyne (e.g. according to Formula 3) and an ethoxylated siloxane work extremely well in the context of the present invention. Such mixtures are capable of significantly reducing the static and dynamic surface tensions of an ink composition according to the present invention and the surface tension remains low during drying of the ink composition.

[0201] In an embodiment, the mixture of surfactants comprises a third surfactant being a silicone surfactant (surfactant of the second type) different from the second surfactant, in particular an ethoxylated siloxane surfactant different from the second surfactant, preferably selected from the group consisting of BYK 348, BYK 349 (BYK), Silwet L-77 (Sabic), Tegowet 240 (Evonik).

[0202] In particular, a mixture of BYK 348 and Tegowet 240 has shown to be suitable for the purpose of this embodiment.

[0203] Inks comprising such a mixture of surfactants show a significant improvement of print quality. In particular when such ink compositions are used in single pass printing, such ink compositions improve streakiness (i.e. white areas in the print).

[0204] In an embodiment the mixture of surfactants comprises an acetylene glycol and a silicone surfactant, in particular an ethoxylated siloxane, as is exemplified in example 1 of the present application.