silver glass available from Ishizuka Glass under the trade name IONPURE. Inorganic chlorides are preferred, especially magnesium chloride and ammonium chloride. A range of ratios from 1:10 to 5:1 (chloride to silver ion). The h-PEI derivatives also suffered from discoloration and it was found that potassium citrate reduced or eliminated the yellowing of the h-PEI.

Summary ~~of the Invention~~

The present ~~invention~~ disclosure aims at providing an antimicrobial ionomer composition, which comprises an amine functional cationic polymer and silver halide.

In a first aspect, there is provided an antimicrobial ionomer composition which comprises an amine functional cationic polymer compound and silver halide.

In a second aspect, there is provided a method of producing a polymeric antimicrobial composition, comprising reacting together

(i) at least one amine functional polymer and silver halide; or

(ii) at least one amine functional polymer and at least one non-halide silver salt or complex compound and hydrogen halide and/or alkaline metal halide salt; and,

(iii) optionally, at least one stabilizer substance.

In a third aspect, there is provided the use of an ionomer composition according to the first aspect or a composition produced by a method according to the second aspect for coating of host surfaces.

According to the ~~invention~~present disclosure, an antimicrobial amorphous ionomer composition can be obtained by a process comprising reacting at least one amine functional polymer and a silver halide. Alternately, the composition can be obtained by a process comprising reacting a amine functional polymer and at least one silver non-halide salt or complex compound and hydrogen halide or an alkali metal or alkaline earth metal or ammonium halide salt.

Thus, in a first preferred embodiment the antimicrobial ionomer composition is obtained by reacting together in a solvent matrix

- at least one polymer exhibiting functional amine groups, and
- a silver halide.

In another preferred embodiment, the present antimicrobial ionomer composition is obtained by reacting together in a solvent matrix

- at least one polymer exhibiting functional amine groups,
- at least one organic silver salt or complex compound and
- hydrogen halide, an alkali metal or alkaline earth metal halide salt or ammonium halide salt, or a combination thereof.

In further preferred embodiments, the present antimicrobial ionomer composition is further balanced and controlled by including stabilizing components in the composition. In further preferred embodiments, the stabilizing components comprise a sulfonamide group

containing organic substance(s). In some embodiments, said stabilizer substance may be the counter-anion or ligand of said at least one organic silver salt or complex compound.

In some embodiments, said antimicrobial composition includes additional components, such as cross-linking agents, hydrophobic modifiers, water repellents, various stabilizers and surfactants.

The preparation methods disclosed above can also be combined.

The antimicrobial ionomer composition according to the ~~invention~~ present disclosure can be used for coating and treating a great variety of host surfaces.

More specifically, the present ionomer compositions are mainly characterized by what is stated in the characterizing part of ~~claim 1~~the first aspect.

The method according to the present invention is characterized by what is stated in the characterizing part of ~~claim 25~~the second aspect.

The use of the ionomer compositions is characterized by what is stated in ~~claim 31~~the third aspect.

The ~~invention~~ present disclosure provides considerable advantages. Generally, the novel composition is suitable for use as an antimicrobial coating, antimicrobial and sanitizing finish, antimicrobial additive and as antimicrobial component for formation of new antimicrobial materials.

The novel antimicrobial ionomer compositions are particularly useful for coating of various substrates, such as fiber, fabric and bulk material surfaces, including various synthetic, semisynthetic and natural fibers, woven fabrics, nonwoven fabrics, knitted fabrics, papers, various polymer surfaces, metal surfaces, various coating surfaces, wood surfaces and fibers. The novel antimicrobial ionomer compositions are particularly useful for antimicrobial wet wipes, hand sanitizer liquids and cosmetics.

The ionomer composition according to the present ~~invention~~ disclosure provides an enhanced antimicrobial effect, optical performance and stability which surpasses that of known

antibacterial compositions comprising different silver sources mixed with polyamine polymers. It appears that halide carrying ionomers of polyamine and silver provide enhanced adhesion properties, antimicrobial activity, control of silver-ion release and optical performance. The ionomer composition according to the present ~~invention~~disclosure is preferably free of particles.

Next the ~~invention~~ present disclosure will be examined more closely with the aid of a detailed description and with reference to a number of working examples.

Detailed Description of Preferred Embodiments

The present invention discloses novel antimicrobial compositions comprising ionomers of amine functional polymers (i.e. polymers exhibiting functional amine groups) and metal halides. According to a preferred embodiment of the ionomer composition according to the invention, the composition is produced in – and it therefore also comprises – a solvent matrix, preferably comprising alcohols, such as methyl alcohol or ethyl alcohol, isopropyl alcohol or water and combinations thereof.

In a first preferred embodiment, the ionomer compositions are obtained by reacting together at least one amine functional polymer (ionomer prepolymer, carrier polymer) and silver halide. In another preferred embodiment the ionomer compositions are obtained by reacting together at least one amine functional polymer (ionomer prepolymer, carrier polymer), at least one non-halide silver salt or complex compound and hydrogen halide and/or alkali metal or alkaline earth metal (in the following jointly designated "alkaline metal") halide salt.

In one embodiment, an amine functional polymer "carrier" polymer is reacted together with either silver halide or a silver salt or complex compound, however in the latter case the composition is halidized with either hydrogen halide or alkaline metal halide salt ("halide compound") in order to obtain the composition characteristic to the invention. In a preferred embodiment, at least one stabilizer component/substance is included in the system (composition). With both routes the obtained product possesses similar essential properties independent of variations in the proton or alkaline metal cation or alkaline metal salt concentrations.