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REMOVAL OF DYE FROM HAIR

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ABSTRACT OF THE DISCLOSURE

Composition for application to human hair to remove dye therefrom is a two-phase liquid system of water and organic solvent for the dye, the system containing at least 1% by weight of dissolved salt and having a pH of 7.5–11.5.

This invention relates to removal of dye from hair and pertains more specifically to a two-phase liquid system containing water and organic solvent and to the removal of dye from hair therewith.

The individual who dyes his or her hair at home and also professional hairdressers are frequently faced with the problem of removing dye from hair, either as a preliminary step in changing to a different color for the hair or in lightening a shade which is undesirably dark or intense.

The compositions previously used to remove color from hair are for the most part adapted from the textile field, generally being strong reducing or oxidizing agents and adapted for complete removal of dye. Many of the previous compositions not only remove the dye completely but also destroy the natural pigment of human hair, leaving a highly modified hair fiber which reacts with dyes, waving agents and other hair treating materials differently from normal hair, so that it is difficult to achieve desired results with certainty in the further treatment of such hair.

While it is true that in some, but not many, instances, total color removal is needed, we find that the majority of situations really require a lightening of dyed color on human hair. Thus, the cosmetic properties of a color-removing composition for human hair must be sufficiently adaptable to serve a two-fold purpose: (1) to partially remove the color of an overdyed head of hair and (2) to completely remove the color when required. Furthermore, these compositions should perform this function without destroying or altering the natural color or pigmentation of the hair, and they should have at most a mild effect upon the scalp.

Therefore, it is an object of our invention to provide a color-stripping composition that is effective on human hair and capable of either partially or totally removing the color.

It is another object of our invention to remove color from dyed hair without altering or destroying the natural color or pigmentation of the hair.

It is also an object of our invention to remove color from dyed human hair without irritating or otherwise injuring the scalp and by means of a short and simple process free from objectionable odor.

It has now been found that dye may be removed from dyed hair by applying thereto a composition comprising a two-phase liquid system including water and a liquid organic solvent for the dye, at least 1% by weight (based on the weight of the liquids) of an inorganic salt dissolved in said system, and an alkaline material dissolved in said system to provide a pH from 7.5 to 11.5 in the aqueous phase, the amount of each liquid phase being at least 1% by volume of the total composition. The compositions of the present invention are particularly

effective in removing from hair acid dyes including acid premetallized dyes and acid milling dyes. The compositions are stable when stored for many months and produce no objectionable odors when applied to hair because they contain no oxidizing or reducing agents or other ingredients which react chemically with the hair. They are effective when applied to the hair at room temperature (20° C.) as well as at somewhat higher temperatures up to 45° C. for a short period of time of the order of five minutes to an hour (the longer the time and/or the higher the temperature, the more complete is the color removal) and have little or no irritating or other undesirable effect upon the scalp.

The compositions which are most effective are those in which each of the two phases of liquid amounts to at least 10% by volume of the total liquid system. While many of the organic solvents which may be used are somewhat soluble or miscible in water, it will be noted that in general one phase contains mostly water and can be called the aqueous phase, while the other contains mostly organic solvent. Among the solvents for dyes which may be used in the compositions of the present invention are alcohols such as n-propanol, isopropanol, n-butanol, isobutanol, n-pentanol, tetrahydrofurfuryl alcohol, octylene glycol, benzyl alcohol, 2-phenylethanol, C_3-fluoroalcohol, C_5-fluoroalcohol, 3-chloro-1,2-propanediol, 2-ethyl-2-nitro-1,3-propanediol; ethers such as 1,4-dioxane; ether-alcohols such as 2-phenoxyethanol, 2-butoxyethanol, propoxypropanol; phenols such as phenol, p-cresol, 3,4-dimethyl phenol; ketones such as cyclohexanone, methyl ethyl ketone, isophorone; esters such as butyl lactate, propylene carbonate, ethyl acetate; nitromethane; gamma-butyrolactone; and the like.

The relative proportions of the water and organic solvent may vary over a wide range provided two separate liquid phases are present in the composition, each phase amounting to at least 1% by volume of the total composition. Preferably each phase amounts to at least 10% by volume of the total composition.

Any of the water-soluble neutral salts of alkali and alkaline earth metals may be used in the compositions of the present invention, preferably the inorganic salts, provided they are approximately neutral, i.e. provided they produce a pH between 6.5 and 7.5 when in the form of a 1% by weight solution in water at 20° C. Those most useful are various approximately neutral chlorides, bromides, iodides, fluorides, nitrates, sulfates, and monohydrogen phosphates of sodium, potassium, lithium, magnesium, and calcium. By "water soluble" is meant soluble in water to the extent of at least 1% by weight at 20° C. The salt dissolves primarily in the aqueous phase. The amount of salt in the composition may vary from as little as 1% by weight of the water present to the maximum which will dissolve in the water.

Any alkaline material soluble in water may be used to achieve the desired slight alkalinity in the composition. Among the readily available materials which may be used are monoethanolamine, diethanolamine, sodium hydroxide, potassium hydroxide, ammonia, ammonium carbonate, potassium bicarbonate, sodium bicarbonate, and the like.

The composition may also contain any conventional additives for hair treating compositions such as thickeners, emollients, haid conditioning agents, perfumes, etc.

The following specific examples are intended to illustrate more fully the nature of the present invention and not as a limitation upon its scope.

EXAMPLE 1

Blond hair was dyed to a very deep dark green color using D & C Green 5, an acid dye. A series of aqueous solutions was prepared, each containing 16% by weight

of sodium sulfate and 5% of ammonium hydroxide (pH 11.4). Different quantities of n-propanol were added to successive samples of the solution and it was found that approximately 12% by weight of propanol was required before two separate phases appeared. Compositions containing respectively 12, 20, 28 and 36% by weight of n-propanol, each having an aqueous phase and a separate alcoholic phase amounting to more than 1% by volume of the total composition were tested by immersing a tress of the dyed hair in each for thirty minutes at room temperature (20° C.), the weight ratio of liquid composition to hair being 50/1. The hair tresses were then removed from the liquid composition, rinsed with water, and examined for color. In each case the green dye color was completely removed. Tests of similar compositions containing less than 12% n-propanol and having only a single phase showed them to be ineffective to remove all of the green dye from hair tresses under the same conditions.

EXAMPLE 2

To another sample of the aqueous solution of Example 1 was added 8% by volume (based on the volume of aqueous solution) of benzyl alcohol. Two separate liquid phases were immediately apparent, the alcoholic phase amounting to more than 1% by volume of the total composition. Immersion of a tress of the green-dyed hair of Example 1 in this composition for thirty minutes at 30° C. (liquid/hair weight ratio approximately 50/1). followed by rinsing in water, was effective to remove the color from the hair.

EXAMPLE 3

The procedure of Example 2 was repeated except that 12% by volume of n-butanol was substituted for the benzyl alcohol, two liquid phases again being produced, the alcoholic phase being greater than 1% by volume of the total composition. The results were the same when tested under the same conditions.

EXAMPLE 4

A solution (pH 11.2) was prepared containing 16% by weight of sodium sulfate, approximately 0.05 mole of monoethanolamine, and 20% n-propanol, the balance being water. Immersion of a tress of the green-dyed hair of Example 1 in this composition, which displayed two separate liquid phases, under the same conditions as in Example 2, converted the hair to a pale straw color, showing virtually complete removal of the dye.

EXAMPLE 5

A composition was prepared as in Example 4 except that isopropanol was employed instead of n-propanol. The results were the same when tested under the same conditions.

EXAMPLE 6

A composition was prepared as in Example 4 except that 1,4-dioxane was substituted for the n-propanol. The results were the same when tested under the same conditions.

In all of the foregoing Examples 1 to 6 inclusive the hair after treatment was soft and natural appearing, free from objectionable odor. Although the compositions may be applied to the hair at higher temperatures and/or maintained in contact with the hair for longer periods of time without harmful effect, these more drastic conditions are not required. While a weight ratio of about 50/1 was used in the examples for the sake of precision, it is not essential that this ratio be used and in fact such a high ratio can ordinarily not be achieved on the head. Simple spraying or swabbing of the composition on a head of hair suffices, the ratio of composition to hair being whatever is the result of such procedure. In general, higher ratios are more effective, ratios of 2/1 or more being preferred.

Smilar results are obtained when compositions of this invention are used on hair dyed with other dyes, whether acid, acid premetallized, or acid milling. Combinations of two or more liquid organic solvents may be employed in a single composition.

What is claimed is:

1. A composition for removing from human hair dyes selected from the group consisting of acid dyes, acid prematallized lyes, and acid milling dyes, which composition consists essentially of a two-phase liquid system including water and a liquid organic solvent for said dyes, said solvent being selected from the group consisting of n-propanol, isopropanol, n-butanol, isobutanol, n-pentanol, tetrahydrofurfuryl alcohol, octylene glycol, benzyl alcohol, 2-phenylethanol, C_3-fluoroalcohol, C_5-fluoroalcohol, 3-chloro - 1,2-propanediol, 2-ethyl - 2 - nitro-1,3-propanediol, 1,4-dioxane, 2 - phenoxyethanol, 2 - butoxyethanol, propoxypropanol, phenol, p-cresol, 3,4-dimethyl phenol, cyclohexanone, methyl ethyl ketone, isophorone, butyl lactate, propylene carbonate, ethyl acetate, nitromethane, and gamma-butyrolactone, at least one percent by weight, based on the weight of the water, of a water soluble neutral inorganic salt of a member of the group consisting of alkali and alkaline earth metals dissolved in said system, said salt being soluble in water to the extent of at least one percent by weight at 20° C., and an alkaline material dissolved in the system to provide a pH from 7.5 to 11.5 in the aqueous phase, said system being free from oxidizing and reducing agents, the amount of each liquid phase being at least one percent by volume of the total composition.

2. A composition as claimed in claim 1 in which the amount of each liquid phase is at least 10% by volume of the total composition.

3. The method of removing dye from dyed human hair which comprises applying to said hair a composition as claimed in claim 1, then rinsing the hair with water.

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