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3,378,444

HAIR BLEACHING COMPOSITION

Betty F. Swanson, White Bear, Minn., assignor to Rayette-Faberge, Inc., St. Paul, Minn., a corporation of Minnesota

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5 Claims. (Cl. 167-88)

This application for United States Letters Patent is a continuation-in-part of copending application Ser. No. 145,780 filed Oct. 17, 1961, and now abandoned.

This invention relates to the bleaching of human hair and particularly to a bleaching composition especially adopted for "touch up" purposes in bleaching new hair growth of a fraction of an inch close to the scalp. To be successful, such localized bleaching must involve a minimum of overlapping of previously bleached hair, which would over-bleach and cause hair damage, and it should minimize scalp irritation from ammonia conventionally used with peroxide to effect the bleach. To be effective, the composition must remain in place at the base of the hair for the time needed for the bleach, retaining, while in place, the optimum alkalinity and moisture content needed to continue the bleaching action. To give such compositions the thickness or body needed for immobility in local application, it has been common to add adsorbent "white henna" materials such as mixtures of magnesium carbonate and magnesium oxide, magnesium trisilicate or the like. Such adsorbents and bleach compositions using them have a number of limitations which the present invention seeks to obviate.

In accordance with the present invention, a dry mixture of an anhydrous water-dispersible, alkaline, gel-forming silicate of an alkali metal such as sodium or potassium and water-dispersible, alkali or ammonium salts of per-acids, such as sodium, potassium, or ammonium persulfate is mixed with hydrogen peroxide and a liquid alkaline ammonium soap in a pH range of 9.3 to 10.0 and the mixture gelled to form a bleaching composition which I have found possesses unexpected properties far superior to other compositions for the purpose, including those employing adsorbents and the same per-acid salts. The composition maintains a stable alkalinity at the optimum pH value; it retains its moisture content over long bleach processing times and it can readily be shampooed out of the hair with no dry powdery residue. The composition affords a wide range of selectivity of bleaching strengths by enabling the operator to mix the hydrogen peroxide with a unit quantity of liquid ammonium soap and selected different quantities of dry powder mix, including the silicate and the per-acid salts, to form a range of bleaching compositions of different graded strengths but in which the pH value remains within a desired narrow range.

The preferred components embodying the touch up composition of my invention as applied to the hair comprise:

- Hydrogen peroxide as a bleaching agent;
- Aqueous ammonium hydroxide to provide free ammonia;
- Fatty acid;
- Solvents;
- Water-dispersible alkali and ammonium persulfate salts; and
- Anhydrous water-dispersible alkaline gel-forming silicate of an alkali metal.

The composition may also include wetting agents, dyes, perfumes, and the like.

The fatty acid and ammonium hydroxide form an ammonium soap or bleach base which is liquid at room tem-

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perature with an alkaline pH. Oleic acid is preferred, but others, including myristic, palmitic, and lauric, may also be used, as may stearic acid, although a stearic soap generally requires additional solvent to lower the viscosity. The soap contributes alkalinity, aids in achieving the desired consistency of the gel, and functions as a shampoo in the removal of the bleach. We have found an alkaline soap liquid having a pH of 9.3 to 10.0 to be satisfactory for admixture with the solids mixture. Further, a stoichiometric excess of ammonia hydroxide to fatty acid is used. A mole ratio of 1.25-1.6 hydroxide per mole of fatty acid is the preferred range.

The water-dispersable per-acid salts are preferably alkali persulfate, either ammonium or potassium, and superior results are achieved by a mixture of both. The composition preferably should provide persulfate, and both ammonium and potassium ions in solution, for which purpose, of course, one salt need not be a persulfate but can be a water-soluble sulfate or a soluble salt of another acid. I have obtained good results with a mixture of potassium persulfate and diammonium phosphate. In my preferred formula, I use approximately three portions of portions of potassium persulfate to one of ammonium persulfate. The persulfate salts aid in the bleaching by their oxidizing action, thus reducing the quantity of hydrogen peroxide required; they act with the alkali metal silicate and the soap not only to buffer the bleach to an alkalinity within the desired pH range (which persists while the bleach acts on the hair despite volatility of other alkaline components) but also to achieve a gel of desired consistency which lasts throughout the bleaching operation. The gel may have a broad range of viscosity. However, it must not be too low, otherwise it will flow throughout the hair. Neither must it be so thick as to interfere with its uniform distribution on the hair contiguous to the scalp. Desirably, the composition possesses the property of reduced viscosity when subjected to stress and a firming when the stress is removed. In this way the bleaching composition flows onto the hair during application and then sets to a more rigid form so as to prevent flow to other areas of the hair.

The anhydrous water-dispersible, alkaline gel-forming silicate of alkali metal forms, with the other components, a gel of desired consistency and acts with the alkali metal and ammonium per-salts and soaps to buffer the bleach to the desired range of alkalinity, despite varying proportions of solids to liquids, as I shall refer to, and which alkalinity persists stably during the bleach. I prefer sodium metasilicate as it is readily dispersible as a finely divided powder, and is highly alkaline. The sodium metasilicate aids in imparting the required alkalinity with a lower pH value than if ammonium hydroxide alone were used.

The liquid and dry wetting agents employed aid in the formation of a smooth gel quickly and for this use must be stable and compatible to alkalinity and oxidizing agents. Dry wetting agents include Aerosol Os (isopropyl naphthalene sodium sulfonate), Aerosol OTB (dioctyl ester of sodium sulfosuccinic acid), Alfracal (alkyl aryl sodium sulfonate) Dupanol ME dry (sodium lauryl sulfate) and the like. The liquid wetting agents, also stable in the presence of alkaline and oxidizing agents, include Igepal CO-430 (nonylphenoxypoly (ethyleneoxy) ethanol) and Brij 30 (a polyoxyethylene lauryl ether).

My composition has a pH within the range of 9.3 to 10.0.

Although there are specific relative amounts in which these components are preferably employed for best results, a feature of my invention is that the liquid components, in certain proportions, separately packaged, may be admixed for use in a wide range of ratios of total packaged liquids to total packaged solids to afford a range of bleaching actions while providing the desired gel consistency and

the desired pH within a limited range. The selectability is illustrated by the following examples:

for each of the preparations is indicated in the following table:

TABLE
[Solids (percent by weight of components)]

Examples.....	4	5	6	7	8	9	10	11
Ammonium Persulfate.....	42.2	21.0	14.4	70.0	84.4	63.4	21.0	21.0
Potassium Persulfate.....	42.2	42.4	70.0	-----	-----	21.0	63.4	63.3
Sodium Persulfate.....	-----	21.0	-----	-----	-----	-----	-----	-----
Sodium Metasilicate.....	15.5	15.5	15.5	29.9	15.5	15.5	7.75	12
Potassium Silicate.....	-----	-----	-----	-----	-----	-----	7.75	3.6
Dry Wetting Agent.....	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
pH.....	9.75	9.8	10.0	9.75	9.3	9.5	9.6	9.8

Example 1

The following liquids and the following solids were separately mixed and separately packaged:

Liquids:	By weight (percent)	
Fatty acid	22	25
Ammonium hydroxide (29% aq. solution) ---	7	
Wetting agent	40	
Alcohol	13	
Dyes, chelating agents, etc.	1	30
Water	17	
	100	
Solids:		35
Ammonium persulfate	21	
Potassium persulfate	63	
Sodium metasilicate	15	
Dry wetting agent	1	
	100	40

For a single application, 4 ounces of 20-volume hydrogen peroxide were mixed with 12 grams of solids and the mixture shaken. Two ounces of the liquids were then added to form a creamy paste ready for application to the hair. The composition had a pH of about 9.3.

Example 2

The same mixture was used as in Example 1 except that twice as much of the dry solids, 24 grams, were added to the same quantity, 4 ounces, of hydrogen peroxide and the same quantity, 2 ounces, of liquids. A creamy gel of substantially the same physical characteristics as in Example 1 was obtained and with a pH of about 9.5, which produced a lighter and somewhat faster bleach than the composition of Example 1.

Example 3

The same mixture as in Example 1 again were employed except for the use of three times the solids, or 36 grams. Again, the consistency of the gel was about the same, the pH had not risen significantly, being about 9.6, still within the range, but now the mixture bleached substantially lighter and faster.

In these examples the sodium metasilicate is present as about 15% of the dry solids and the per-salts total about 85% so that the ratio of the gel forming silicate to the per-salts is approximately 1 to 6. I have found that this ratio should be kept within the range of from about 1 to 4 to about 1 to 7.

Examples 4-11

The following preparations were made and combined with the liquid component of Example 1 according to the procedure of Example 3. The pH of the final composition

In use, I have found that the composition has a creamy gel consistency which is very well adapted for localized application to the scalp portions of the hair strands in retouching, although, of course, the composition may be used for a total bleach. It affords a fast bleaching action with the paste retaining its moisture consistency and alkalinity until the bleach is finished, when it may readily be shampooed away by working up suds simply by the addition of water. When used locally at the scalp or root portion of the hair, it is of a consistency to facilitate application only to the new hair growth without overlapping previously bleached hair; and the peroxide is held well in the mix without running on the scalp as with prior similar compositions.

I claim:

1. A dry powder for admixture with hydrogen peroxide and liquid ammonium soap to form a hair bleach of gelatinous consistency, comprising a persulfate salt of a cation selected from the group consisting of alkali metals and ammonium, and anhydrous alkali metal silicate, the silicate and persulfate salts being present in a ratio range of about 1:4 to 1:7 and forming, upon wetting with both of said liquids, a gel in the pH range of about 9.3 to 10.0.

2. A dry powder for admixture with hydrogen peroxide and a liquid ammonium soap to form a hair bleach of gelatinous consistency comprising approximately three parts of potassium persulfate and one part of ammonium persulfate and anhydrous alkali metal silicate, the silicate and persulfate salt mixture being present in a ratio range of about from 1:4 to 1:7 and forming, upon wetting with both of said liquids, a gel in the pH range of about 9.3 to 10.0.

3. A dry powder for admixture with hydrogen peroxide and a liquid ammonium soap to form a hair bleach of gelatinous consistency comprising ammonium persulfate and potassium persulfate and anhydrous alkali metal silicate, the silicate and persulfate salts being present in a ratio range of about from 1:4 to 1:7 and forming, upon wetting with both of said liquids, a gel in the pH range of about 9.3 to 10.0.

4. A dry powder for admixture with hydrogen peroxide and a liquid ammonium soap to form a hair bleach of gelatinous consistency comprising a mixture of ammonium persulfate and potassium persulfate, the ammonium persulfate being present in minor quantity and the potassium persulfate being in major quantity, and with anhydrous sodium metal silicate, the silicate and persulfate salts being present in a ratio range of 1:4 to 1:7 and forming, upon wetting with both of said liquids, a gel in the pH range of about 9.3 to 10.0.

5. A hair bleaching composition for direct application to new human hair growth which comprises the combination of hydrogen peroxide, liquid ammonium soap, a persulfate salt of a cation selected from the group consisting of alkali metals and ammonium, and anhydrous alkali

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metal silicate, the said silicate and said persulfate being present in a ratio range of from about 1:4 to 1:7, the composition having a gelatinous consistency and a pH in the range of from about 9.3 to 10.0.

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ALBERT T. MEYERS, *Primary Examiner.*
JULIAN S. LEVITT, SAM ROSEN, *Examiners.*
VERA C. CLARKE, *Assistant Examiner.*