United States Patent Office 3,190,803 Patented June 22, 1965

3,190,803

PVP-FORMAMIDINE SULFINIC ACID COLOR STRIPPING MEDIUM

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No Drawing. Filed July 24, 1962, Ser. No. 212,157
9 Claims. (Cl. 167—88)

The present invention relates to improvements in stripping or bleaching colored keratin substrates, particularly living hair.

It is conventional to strip or bleach dyed textile fibers by treating them with alkaline reducing agents. Alkali hyposulfates (alkali salts of dithionic acid) or sulfoxylates (derivatives of sulfoxylic acid) have been used as effective reducing agents, for instance. However, if such agents are used at their conventional high alkalinity, keratin substrates, such as living human hair, are unfavorably affected thereby. It is not possible to use media of a pH in excess of about 11.0 without damaging keratin fibers or hair.

It is accordingly the primary object of the present invention to overcome this disadvantage and to provide a color stripping medium and method for colored keratin substrates, which is highly efficient in bleaching the substrates without damaging the same.

This and other objects are accomplished in accordance with this invention by applying to colored keratin substrates, such as living hair, a color stripping medium consisting of a weakly alkaline solution of a synergistic combination of about 1 to 2% of formamidine sulfinic acid (thio-urea-dioxide) and 5 to 8% of polyvinyl pyrrolidone, the percentages being by weight of the solution.

The pH of the medium preferably does not exceed 9.0 and the pH may be adjusted to this value by adding a buffering agent to the medium, for instance ammonium bicarbonate. Any suitable and commercially available buffering agent effective in a pH range of about 7 to 9 may be used, of course, as will be evident to the skilled in the art, such as any ammonium salt of a weak acid, including ammonium acetate, ammonium citrate, ammonium lactate.

In a preferred embodiment, the color stripping medium also comprises an agent facilitating the solution of the synergistically combined reducing agents in the alkaline solvent. An effective agent for this purpose is, for instance, a glycol mono-alkyl ether, the alkyl being a lower alkyl group, such as butyl. For instance, Cellosolve, butyl Cellosolve or methyl Cellosolve may be used for this purpose.

Also, a more uniform application to the substrate will be facilitated if the color stripping medium contains a thickening agent to impart a high viscosity to the medium. This agent must be inert to the alkaline and reducing components and a useful agent of this type is, for instance, cellulose sodium glycol monoacetate. Generally, carboxymethyl cellulose, methyl cellulose and their alkali salts may be used as thickening agents.

It has been found that formamidine sulfinic acid prepared according to the process of U.S. Patent No. 2,150,921 remains stable in the medium for extended periods of time. Therefore, the color stripping medium of this invention may be bottled ready for use and stored in this condition. This is a considerable advantage over conventional bleaching media whose components are stored in separate containers and are mixed only immediately before use.

The melting point of the formamidine sulfinic acid prepared in the indicated manner lies between about 126–128° C.

The polyvinyl pyrrolidone component is a known mild bleaching agent in the textile industry but, in the color stripping medium of the invention, it exerts a stabilizing effect on the mixture and synergistically combines with the formamidine sulfinic acid in effectuating the color stripping.

While the invention is not limited thereby, it will be illustrated in connection with the following examples, wherein all parts are by weight:

Example 1

1.5 parts of formamidine sulfinic acid, 5.0 parts of polyvinyl pyrrolidone (commercially available in Germany under the trademark "Luviskol K30"), 5.0 parts of glycol monobutyl ether, 1.0 part of ammonium bicarbonate, 0.5 part of 25% ammonia and 2.5 parts of cellulose sodium glycol monoacetate (commercially available in Germany under the trademark "Tylose KN600") are thoroughly stirred into water to provide 100 parts of the solution. The resultant product is a nearly colorless, highly viscose medium.

Dyed human hair is nearly completely stripped of the artificial color when this medium is applied thereto for a period of 15 to 30 minutes at normal body temperature. If the temperature is increased, the duration of the treatment is correspondingly reduced.

Physical and chemical examination of the stripped hair show no appreciable damage.

Example 2

The same medium as in Example 1 is prepared, except that the amount of formamidine sulfinic acid is reduced to one part while the polyvinyl pyrrolidone content is increased to eight parts. The results do not differ substantially from those of Example 1.

Also, substantially the same results are obtained when different Cellosolves are used, including methyl and ethyl Cellosolve.

What I claim is:

1. A color stripping medium consisting of an aqueous alkaline solution of about 1 to 2 percent of formamidine sulfinic acid and of 5 to 8 percent of polyvinyl pyrrolidone, the percentages being by weight of the solution, and the pH of the solution not exceeding 9.

2. The color stripping medium of claim 1, further comprising 2 to 7%, by weight of the solution, of a glycol mono-(lower)-alkyl ether.

3. The color stripping medium of claim 2, wherein the glycol mono-(lower)-alkyl ether is glycol monobutyl ether.

4. The color stripping medium of claim 1, further comprising a buffering agent to adjust the pH to a value not exceeding 9.

5. The color stripping medium of claim 5, wherein said buffering agent is ammonium bicarbonate.

6. The color stripping medium of claim 1, further comprising a thickening agent which is inert to the other components of the solution.

7. The color stripping medium of claim 6, wherein said thickening agent is cellulose sodium glycol monoacetate.

8. The color stripping medium of claim 1, further comprising about 5% of glycol monobutyl ether and about

2.5% of cellulose sodium glycol monoacetate, both based on the weight of the solution.

9. A method of stripping color from living hair which comprises the step of applying thereto a stripping medium consisting of an aqueous alkaline solution of about 1 to 2 percent of formamidine sulfinic acid and 5 to 8 percent of polyvinyl pyrrolidone, the percentages being by weight of the solution, and the pH of the solution not exceeding 9.

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