DYEING HUMAN HAIR WITH A PEROXY COMPOUND AND A REACTIVE DYESTUFF
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4 Claims

ABSTRACT OF THE DISCLOSURE
A process for dyeing human hair including the steps of (a) oxidising the hair with a peroxide acid or a salt thereof, such as the potassium triple salt of Caro’s acid, and (b) subsequently reacting the oxidised hair with one or more reactive dyes, for example a dye containing a vinyl sulphone precursor, or a mono- or di-chlorotriazine group.

CROSS-REFERENCES TO RELATED APPLICATIONS
This is a continuation-in-part of my application Ser. No. 521,797, filed Jan. 20, 1966, for the dyeing of human hair, which application is now abandoned.

BACKGROUND OF THE INVENTION
(1) Field of the invention
This invention relates to the dyeing of human hair, especially living hair on the head and more particularly to new and improved methods for dyeing the same. The invention falls within Class 8 of the patent classification.

(2) Description of the prior art
French Patent No. 1,333,995 describes a process for dyeing animal hair comprising treatment of the hair with a peroxide compound, subsequently treating it with a solution of a reducing agent and finally applying a reactive dyestuff. The patent is mainly concerned with the dyeing of textiles such as wool and states that if even dyeing is to be obtained the reduction, normally undertaken with sulphur compounds, is obligatory.

A disadvantage of the above process applied to human hair would be that it would involve three operations in the hairdresser’s salon or in the home and that the consumer would come into contact with somewhat unpleasant reducing agents.

(3) Brief summary of the invention
It is an object of the present invention to overcome the above difficulties and to provide a dyeing process which is acceptable to the consumer, convenient and versatile in the range of coloration, which can be achieved.

Accordingly, the present invention provides a process of dyeing human hair which consists of treating the hair with an effective amount of a peroxide compound selected from the group consisting of peroxymonosulphuric acid, peroxymonophosphoric acid, peracetic acid, diperbrassylic acid, perbenzoic acid or the ammonium or alkali metal salts thereof, and subsequently treating the hair with an aqueous solution of a reactive dye to colour the hair.

DESCRIPTION OF THE PREFERRED EMBODIMENTS
Especially suitable as the peroxide compound is the potassium triple salt 2KHSO₅.KHSO₅.K₂SO₄.
Alkaline salts may be mixed with the peroxide compounds. Preferred salts are alkali metal carbonates and phosphates, such as potassium carbonate and sodium phosphate. Soaps may also be used. The pH of solutions or dispersions of the peroxide compound while not being critical is desirably not less than 3 or greater than 10.

The concentration of the peroxide compound in the solution or dispersion applied to the hair is not critical and the use of quite small amounts of the above peroxide compounds will enable a greater dyeing effect to be obtained when the hair is treated with the solution of the reactive dye. The optimum concentration will depend on the particular peroxide compound used but will usually be in the range 0.5 to 10%.

The peroxide compounds used in the process of the invention do not bleach hair.

By a “reactive dye” is meant herein a dye containing a reactive halogen atom or other reactive group, that is to say a halogen atom or other group capable of forming covalent bonds with the hair, or a dye which forms such a group in situ. Examples of classes of such reactive dyes are dyes containing a mono- or di-chloro or bromo 1,3,5-triazinyl group, mono- or di-chloro or bromo-primidyl group, beta-halogeno[propionyl group, beta-halogenoethyl-sulphonyl group, beta-halogenoethylsulphamyl group, chloroacetyl amino, beta-(chloromethyl)-beta-sulphato-ethylsulphamyl group, or a vinyl sulphonyl group.

In the case of the dyes containing a triazinyl group or a primidyl group, in place of the reactive halogen atoms one can use other groups which dissociate in the presence of alkali; examples of such other groups are the sulphonic acid, thiocyanate, sulphophenoxo, sulphopenyl tho, nitro sulphophenoxo groups, and quaternary ammonium groups.

The dyestuffs in these classes may be for example of the nitro-,azo, anthraquinone or phthalocyanine series and may contain free metal or metal in complex formation.

Mixtures of dyes may be used.
Examples of reactive dyes which may be employed in the invention are illustrated below, where possible by reference to structure, trade name and designation in the Colour Index (2nd edition) Supplement (1963) and the Additions and Amendments thereto, published by The Society of Dyers and Colourists, Dean House, Piccadilly, Bradford, Yorkshire, England and incorporated herein by reference.

Some of these dyes, and others besides, are referred to in U.S. Pat. Nos. 3,336,097 and 3,396,736 and in an article in the Collection of Czechoslovakian Chemical Communications, vol. 27, 1962, pp. 268–275 which is also incorporated herein by reference. The names Remazol, Remazol, Procion, Cibacron, Drimarene and Reactone are trade names.
Cibaeron Yellow R  
Procion Yellow HA

Remazol Yellow G  
C.I. Reactive Yellow 14

Cibaeron Brilliant Orange G  
Procion Brilliant Orange HGR

Remazol Brilliant Orange 2R  
C.I. Reactive Orange 7

Cibaeron Brilliant Red 2B  
Procion Brilliant Red H7B

Procion Rubine B  
C.I. Reactive Red 8

Drimarene Red Z-2B  
Reactone Red 2B

Procion Brilliant Blue R  
C.I. Reactive Blue 4
The concentration of the dye in the dye solution is not critical. For most purposes a concentration of about 0.1% will be used and it will not usually be necessary to exceed a concentration of 10%.

It will usually be necessary to make the solution of the reactive dye alkaline. This is conveniently achieved by including alkali metal carbonates or other alkaline salts in the solution.

Solutions of the peroxygen compound or the solutions of the reactive dye or both may contain additionally inert constituents such as thickeners, surface-active agents, or perfumes.

Before actual use the peroxygen compound is preferably kept as a dry powder which is subsequently made up into the required solution; if desired the dye also may be kept as a powder. Other ingredients, if any, mixed with powders of the peroxygen compound or the dye should also preferably be anhydrous. Apart from the above-mentioned additional ingredients, namely alkaline salts, surface-active agents and thickeners, one may also include in the powders, diluents such as potassium sulphate. The powders may be made up into tablet form.

The following examples illustrate the invention. Percentages are on a weight for weight basis.

EXAMPLE 1

A switch of blonde hair was treated with an aqueous solution consisting of potassium peroxymonosulphate triple salt (4%), potassium carbonate (0.2%), and monochloroammonium lauryl sulphonate (20%) and containing as thickening agent Carbopol 934 (30% of 2% gel). The **\[A\] carboxy vinyl polymer of extremely high molecular weight.**
time of the treatment was 1 to 15 minutes dependent on the depth of colour ultimately required. The hair was then rinsed, towel dried and dyed with an aqueous solution of Remazol Black B (2%) containing potassium carbonate (4%) and thickened by the addition of Carbopol 934 as before. The hair was dyed for a period of 10 to 30 minutes at 20 to 40°C, depending on the depth of colour required. The hair was dyed a dark blue colour.

EXAMPLE 2

A switch of blonde hair was treated with an aqueous solution of potassium peroxymonosulphate triple salt (4%) for 5 minutes, rinsed and towel dried. The hair was dyed with an aqueous solution of Procion Brilliant Red 5BS (2%) containing potassium carbonate (4%) for 20 minutes. The hair was dyed a deep red colour.

EXAMPLE 3

A switch of blonde hair was treated with an aqueous solution of peracetic acid (1%) for 10 minutes, rinsed and towel dried. The hair was then dyed with an aqueous solution of Remazol Orange CG (2%) containing potassium carbonate (4%) for 20 minutes. The hair was dyed a bright orange colour.

EXAMPLE 4

A switch of blonde hair was treated with an aqueous solution of potassium peroxymonosulphate triple salt (4%) containing potassium carbonate (0.1%) for 10 minutes, rinsed with water and towel dried. The hair was then dyed with an aqueous solution containing Remazol Black B (0.6%), Remazol Orange GG (0.4%), Procion Printing Green 5G (1.0%) and potassium carbonate (4 g), for 20 minutes at room temperature. The hair was dyed a dark brown colour.

EXAMPLE 5

A switch of Italian blonde hair was treated with an aqueous solution of potassium peroxymonosulphate triple salt (4%) for 5 minutes, rinsed and dried. The hair was then dyed with an aqueous solution of Procion Brilliant Red 5BS (2%) containing potassium carbonate (4%) for 20 minutes. The switch was dyed a deep red colour. One half of this switch was then subjected to repeated treatments and dyeing as described. After four treatments and dyeings no difference in colour between the two halves of the switch was discernible. After further dyeings a slight build-up of colour became apparent.

This experiment demonstrates the lack of colour build-up experienced with the process of the invention relative to conventional methods of dyeing hair.

By the processes described satisfactory uniform dyeing of the hair was obtained.

A feature of this invention is that satisfactory dyeing of human hair can be obtained without any intermediate application of a reducing agent between the treatments of the hair with the peroxo compound and with the reactive dye.

It is of interest that while, in accordance with this invention, pre-treatment of hair with peroxymonosulphuric acid and its salts, considerably increases the uptake of reactive dye by the hair, the same effect is not obtained with peroxysulphuric acid and its salts, used either alone or in combination with hydrogen peroxide.

What is claimed is:

1. A process of dyeing human hair which consists of treating the hair with an effective amount of an aqueous solution or dispersion containing a peroxo compound selected from the group consisting of peroxymonosulphuric acid, peroxymonophosphoric acid, peracetic acid, diperbrassylic acid, perbenzoic acid; alkali metal and ammonium salts thereof; and subsequently treating the hair with an effective amount of an aqueous solution containing an effective amount of a reactive dye to colour the hair.

2. A process as claimed in claim 1, wherein the peroxo acid or salt thereof is applied to the hair as an aqueous solution or dispersion containing 0.5 to 10% by weight of the peroxo compound.

3. A process as claimed in claim 1, wherein the solution of the reactive dye has a concentration of 0.1 to 10%.

4. A process as claimed in claim 1, wherein the peroxo compound used to treat the hair is the potassium triple salt 2KHSO₅.KHSO₄.K₂SO₄.

References Cited

UNITED STATES PATENTS

3,261,824 7/1966 Randall et al. ---------- 8—10 X
3,336,097 8/1967 Fell --------------- 8—10

FOREIGN PATENTS

1,333,995 6/1963 France -------------- 8—10

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