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COMPOSITION AND PROCESS FOR DYEING HAIR

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10 Claims. (Cl. 132—7)

This invention relates to the coloration of hair, and especially to improved compositions and processes for this purpose.

In general, hair is a difficult material to dye or color satisfactorily in many of the desirable shades for the reason that many available textile dyestuffs do not unite with or become affixed to the hair in a way such that good washing fastness is attained. In general, in all coloration arts, such as textile dyeing and printing the most pleasing, natural or artistic shades are obtained by mixtures of colors, the content of some of them often being small where artistic softening, tinting or background shading is important. Thus the scarcity of dyestuffs for hair which produce satisfactory fast dyeing and the necessity of producing pleasing and artistic effects in a large variety of shades are closely allied, and they have presented an unsolved problem heretofore, especially in the cosmetic field where the ultimate in artistic and pleasing effects is most important.

In the coloration or dyeing of furs or dead hair, dyeing processes requiring extremes in the dyeing technique such as high temperatures, can be employed to improve the dyeings. Toxic dyes can also be used for such purposes, but neither high temperatures nor toxic dyes can be prudently used for cosmetic purposes. Special mordanting processes have heretofore been employed for the dyeing of hair. For cosmetic purposes mordanting processes ordinarily require the facilities, skills and services of expert cosmeticians which are evidently costly and they are sometimes unavailable. Hair rinses have been used, but because of the above indicated failure of available dyes to affix themselves to hair readily and satisfactorily the colorations in numerous shades heretofore produced by rinses have been extremely fugitive in respect to washing fastness, often without desirable artistic merit, and sometimes of a kind which are toxic to many individuals. Consequently there has been a long felt need for compositions and processes for coloring hair which will produce dyeings of desirable washing fastness in a variety of pleasing artistic soft shades resembling the beauty of natural hair and which can be self-applied, by simple immersion operations.

It is among the objects of the present invention to provide means for improving the fastness of dye compositions for hair.

Another object is to improve the dyeability of hair.

Another object of the invention is to provide improvements in the blending of colors for hair.

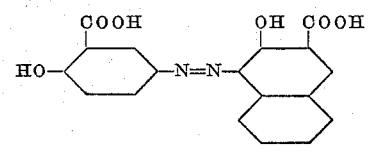
Further objects of the invention will become apparent from the following description.

I have discovered that certain organic compounds cause organic dye materials to adhere to hair in a way which easily produce dyeings of improved washing fastness when applied to the hair in conjunction with solutions of the organic dyes at temperatures which are tolerable to the scalp, such as temperatures of about 90° F. to about 110° F. The compounds are azo compounds having good affinity for hair and relatively good and rapid dyeing properties for hair. They may be combined with dyes both as shade blending agents and as fixatives with other dyestuffs in the dry state, or a solution of the compound may be added to the dyebath. Alternatively, the organic

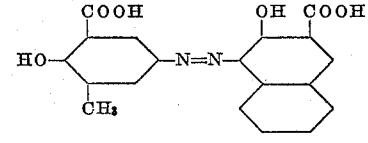
compound may be applied to the hair prior to or subsequent to the application of other dyestuffs. The preferred dyebath composition and processes of the present invention may desirably be utilized as hair rinses.

In operation, the blending agent or fixative appears to operate as if it carried into or onto the hair other dyes which normally do not produce satisfactory dyeings on hair when applied by immersion for a relatively short time, thus having the effect of improving the dyeability of the hair or the affinity of the dye for the hair, as well as the fastness of the dyeing. I am not fully informed whether the blending agent affects the other dyes of the composition or the hair to be dyed, or both; however, it is to be understood that the reasons for the aforesaid appearances are theoretical and are proposed only as an aid in describing the results attained, and that the invention is not to be limited to this theory.

In one desirable form the blending agent or fixative is a mixture of monazo compounds which are represented in their acid form by the formulae,



and



However either one of these compounds may be used effectively.

These compounds, fixatives or blending agents are desirably used in about equimolecular proportions in water solutions in the form of their water-soluble salts, such as their alkali salts but either of them or other mixtures may be used. The sodium salts are highly soluble and satisfactory. These monazo compounds may be conveniently made in the form of their sodium salts, either separately or combined by the methods of making monazo compounds well known to the art and from well known intermediates. The mixtures of the compounds may be a physical mixture or they may be made from a mixture of amines. Their self shade on white hair is a violet shade in moderate weight dyeings and they have excellent dyeing properties and good fastness. When such dyeings are mordanted with iron sulfate, they are purple and these dyeings have excellent fastness properties.

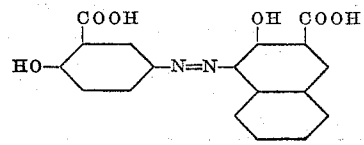
The invention will be described more in detail with reference to specific embodiments thereof which are to be understood as being illustrative of the invention and not limitative thereof. Parts are expressed in parts by weight unless otherwise specified.

Example I

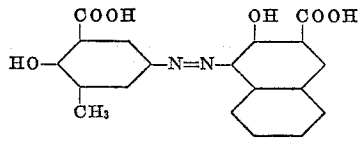
A light blonde shade was produced on natural white hair by immersing the hair in the following dyebath.

19 parts of Du Pont Yellow 2X for hair (C. I. 52)

1 part of an equimolecular mixture of the sodium salts of the compounds which in the form of their acids are represented by the formulae



and



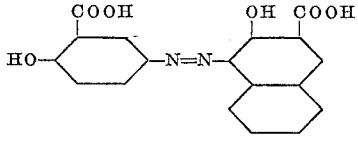
40 parts of surface active agent
1750 parts of water

The hair was treated from 4 to 10 minutes by pouring over the hair the dyebath which was heated to 110° F., and then rinsed. The hair was evenly dyed in attractive natural shades. The dyeing had better washing fastness than a similar dyeing on the same hair made with a similar dyebath except that the compounds represented by the formula were not present.

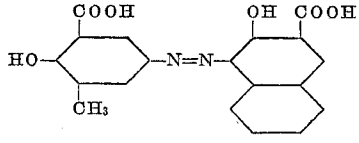
Example II

An ash blonde shade on light grey hair was obtained by immersing the hair in the following composition.

7 parts of Color Index No. 238
1 part of an equimolecular mixture of the sodium salts of the compounds which in the form of their acids are represented by the formulae



and



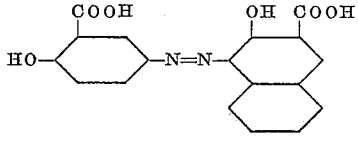
2.2 parts of Color Index No. 720
1.1 parts of surface active agent
263 parts water

The hair was treated with the dyebath heated to 110° F. as described in Example I. Similarly improved dyeings having a natural appearance were obtained.

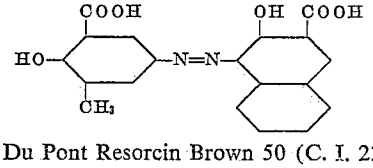
Example III

A modified shade of ash blonde was obtained on dark grey hair by using the following dyebath.

19 parts Du Pont Yellow 2X (C. I. 52)
1 part of an equimolecular mixture of the sodium salts of the compounds which in the form of their acids are represented by the formulae



and



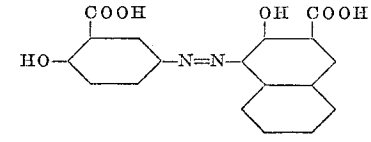
1 part of Du Pont Resorcin Brown 50 (C. I. 234)
40 parts of surface active agent
12,800 parts of water

The hair was treated with the dyebath heated to 110° F. as described in Example I and similar improvements in the dyeings were obtained.

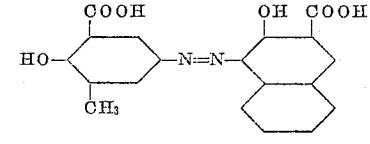
Example IV

A warm dark brown shade on grey dark hair was obtained by immersing the hair in the following dyebath.

2 parts Du Pont Yellow 2X (C. I. 52)
3 parts Du Pont Chromate Brown EBN made by coupling the monoazo dye, Laurents acid→4-nitro-2-amino-phenol to mixed naphthalene diamine and meta toluene diamine
0.5 part surface active agent
1 part of an equimolecular mixture of the sodium salts of the compounds which in the form of their acids are represented by the formulae



and



118 parts water

The hair was treated with the dyebath heated to 110° F. as described in Example I and similar improvements were obtained.

Lighter brown to auburn shades were obtained by using a larger proportion of water; say about 350 parts.

Instead of a mixture of equal parts of the monazo dyes represented by the foregoing formula, any mixture can be used, or if desired, either of the monazo constituents of the described equimolecular mixture may be used advantageously as the blending and fixative agent instead of the mixture. Any water soluble metallizable azo dye operates with the blending and fixative agent, such as the chromable dyes and those which can be metallized by the action of soluble salts of chromium, copper, nickel or iron, either in situ on the hair or in processes similar to the meta-chrome process where the metal salt is added to the dyebath.

In the foregoing examples a surface active agent is one of the constituents of the dye baths. This constituent is not essential to the described improvement which is effected by the fixative-blending constituent. When, however, the surface active agent is present the described effect due to the fixative-blending agent is somewhat improved. Alternatively dyebaths which do not contain the fixative-blending agent are improved when the surface active agent is present in amounts similar to those indicated in the examples. The improvement in such dye compositions which contain only the surface active agent appear to be in respect to the evenness or levelness of the dyeings and the amount of dye which will go onto the hair in unit time, but the color value of the dyeing is not affected by the surface active agent. The surface active agents thus operates in conjunction with the fixative-blending agent to effect an improvement not attainable by the sole action of either one of these components.

Only a few of the class of metallizable dyestuffs are mentioned in the foregoing examples, but it is to be understood that the described improvements are applicable to any of the water soluble metallizable dyestuffs, a number of examples of which are those identified by the following color index numbers of Rowe, to wit Nos. 40, 101, 110, 201, 203, 204, 216, 234, 235, 246, 299, 343, 652, 1034, 1035, 1085, Du Pont Chromate Brown EBR made by successively coupling p-nitro-o-amino-phenol and naphthalene-5-sulfonic acid to resorcinol (unlisted U. S. P. 2,117,707) and many others.

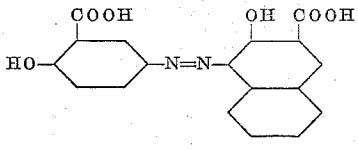
Any of the surface active agents, either cationic, anionic or non-ionic can be used. Those generally classifiable as non-ionic surface active agents are desired.

From the foregoing disclosure it will be recognized

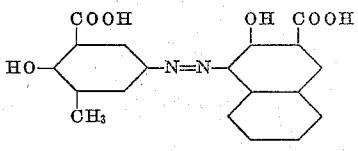
that the invention is susceptible of modification without departing from the spirit and scope thereof, and it is to be understood that the invention is not restricted to the specific illustrations thereof which are herein set forth.

I claim:

1. A composition for dyeing hair which comprises a fixative comprising at least one of the class of water-soluble monazo compounds which in their acid form are represented by the formulae



and



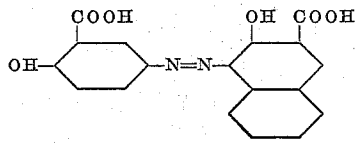
said composition comprising another compound which is taken from the group consisting of other water-soluble metallizable dyestuffs.

2. A composition in accordance with claim 1 in which the fixative is a mixture of the water soluble compounds which in the form of their acids are represented by the formulae of claim 1.

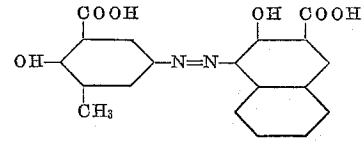
3. A composition in accordance with claim 1 which contains additionally a surface active agent.

4. A composition in accordance with claim 1 in which the other metallizable dyestuff is a water-soluble chromable dye.

5. The process of dyeing hair which comprises applying thereto a water solution of at least one of the class consisting of the compounds which in the form of their acids is represented by the formulae



and



and additionally applying to said hair a solution comprising another compound from the class consisting of the other water soluble metallizable dyestuffs, the solution containing the latter dyestuff being applied until the hair is colored thereby.

6. The process in accordance with claim 5 in which the solution containing the compound of the class represented by the formulae of claim 5 also contains a surface active agent.

7. The process in accordance with claim 5 in which the solution containing the compound of the class represented by the formulae of claim 5 also contains a non-ionic surface active agent.

8. The process in accordance with claim 5 in which the solution containing the compound of the class represented by the formulae of claim 5 contains in addition another water-soluble metallizable dyestuff.

9. The process in accordance with claim 5 in which the solution containing the compound of the class represented by the formulae of claim 5 contains in addition a water-soluble chrome dyestuff.

10. The process in accordance with claim 5 in which the solution containing the compound of the class represented by the formulae of claim 5 contains in addition a surface active agent and another water-soluble metallizable dyestuff.

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