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PHOTOGRAPHIC DEVELOPERS CONTAINING ACYLAMINO GROUPS

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This invention relates to photographic developers and more particularly to p-phenylenediamine developers containing acylamino groups.

It is known that photographic developers of the p-phenylenediamine type are valuable compounds for producing fine grain black and white photographic images and also that these compounds, especially when they contain alkyl substituents on one of the nitrogen atoms, are useful as developers in producing colored photographic images. A serious disadvantage of the p-phenylenediamine developers is that they are highly allergenic, that is, are poisonous to the human skin and, therefore, are somewhat dangerous to use. When the p-phenylenediamines are used in color development processes, it has also been found that they do not always produce the desired color in the final image.

It is, therefore, the principal object of the present invention to provide a new class of photographic developing agents of the p-phenylenediamine type. A further object is to provide photographic developing agents which are less allergenic, that is, less poisonous to the human skin, than the p-phenylenediamines. A still further object is to provide photographic developing agents of the substituted p-phenylenediamine type which are useful in photographic color processes for the purpose of producing images of the desired color.

These objects are accomplished by the present invention by the use as developing agents of acylamino-4-aminodialkyl-anilines.

Compounds suitable for use in my invention are dialkyl-p-phenylenediamines having acylamino substituents such as acetylamino or propionylamino groups on the ring. Dialkyl-p-phenylenediamines such as dimethyl-p-phenylenediamine and diethyl-p-phenylenediamine are suitable for introduction of the acylamino group.

One of the specific compounds which I have found suitable for use according to our invention is 3-acetylamino-4-aminodimethylaniline. This compound is prepared by reducing m-nitrodimethylaniline to the amine and acetylating it with acetic anhydride and glacial acetic acid. The acetylaminodimethylaniline is nitrosated by treatment with sodium nitrite in 2-N-hydrochloric acid and the nitroso derivative reduced at room temperature with hydrogen by using a Raney nickel catalyst.

The compounds which I propose to use may be further substituted in the aromatic ring with other groups including halide, amino, substituted amino, azo, alkyl and aryl groups. These groups tend to alter the color of the final dye image and the color of the image may be controlled in this way.

When used for the formation of colored photographic images, the developers of my invention may be used in conjunction with any well known coupler compounds such as those described in Fischer U. S. Patent 1,102,028, granted June 30, 1914; Mannes & Godowsky U. S. Patent 2,108,602, granted February 15, 1938; Mannes, Godowsky & Peterson U. S. Patents 2,115,394, granted April 26, 1938 and 2,126,337, granted August 9, 1938.

The following example illustrates a developing solution which may be used according to my invention:

A. 3-acetylamino-4-aminodimethyl-aniline	grams	2
Sodium sulfite	do	1
Sodium carbonate	do	30
Water to	liter	1
B. Coupler	gram	1
Acetone	cc	50

B is added to A

The developing agents described in the present application may be used to form photographic images by development of exposed silver halide contained in the usual gelatin carrier or in carriers such as collodion, water-permeable cellulose esters or water-permeable synthetic resins. The sensitive layers may be carried on any suitable support such as glass, paper, cellulose ester or synthetic resins. They may be used with multi-layer films where two or more layers are coated on the same side of a support or where the layers are coated on the opposite sides of a support.

It will be understood that the examples included herein are illustrative only and that my invention is to be taken as limited only by the scope of the appended claims.

I claim:

1. A photographic developing solution comprising as the developing agent a lower fatty acid acylamino-4-aminodialkylaniline.

2. A photographic developing solution comprising as the developing agent a 4-aminodialkylaniline having a lower fatty acid acylamino group in the 3-position.

3. A photographic developing solution comprising as the developing agent a 3-acetylamino-4-aminodialkylaniline.

4. A photographic developing solution compris-

ing as the developing agent 3-acetylamino-4-aminodimethylaniline.

5. A photographic developing solution for producing a colored image comprising a lower fatty acid acylamino-4-aminodialkylaniline as the developing agent and a compound which couples with the developing agent on photographic development to form a colored image.

6. A photographic developing solution for producing a colored image comprising 3-acetylamino-4-aminodimethylaniline as the developing agent and a compound which couples with the developing agent on photographic development to form a colored image.

7. The method of producing a colored photographic image in a gelatino silver halide emulsion layer which comprises coupling the development product of a lower fatty acid acylamino-4-aminodialkylaniline developing agent with a compound which couples with the developing agent on development.

8. The method of producing a colored photographic image in a gelatino silver halide emulsion layer which comprises coupling the development product of 3-acetylamino-4-aminodimethylaniline with a compound which couples with the 3-acetylamino-4-aminodimethylaniline on development.

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