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FOG INHIBITOR FOR PHOTOGRAPHIC DEVELOPERS

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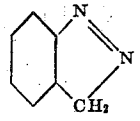
2 Claims. (Cl. 95—88)

This invention relates to photographic developers and particularly to fog inhibiting or toning agents for developers.

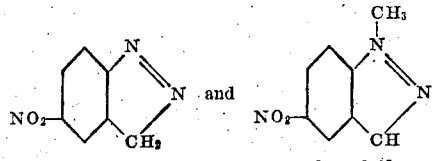
It is well known that fogging occurs in a photographic film or plate when it is developed at temperatures higher than 70° F. or when developed for unusually long periods of time. It is necessary in most cases to use a relatively weak developer in order to avoid the formation of fog. Soluble bromides, such as potassium bromide, have been used in the developer to overcome this but they do not permit development with a strong developer for long periods of time at temperatures which may go higher than 70° F.

We have discovered that certain derivatives of indazole, for example, 5-nitroindazole and 5-aminoindazole, may be incorporated in the developer to obtain all of these advantages. These compounds may be used either in black and white or in color developers. In some cases they may be added to the emulsion or to the subbing or backing layers of the film or plate.

Indazole has the following structural formula:



Specific compounds which we have found suitable are 5-nitroindazole, 1-methyl-5-nitro-indazole, 5-amino-indazole, 5-p-toluene sulfonamido-indazole, 5-benzoylacetamino-indazole, and 5-p-nitrobenzoylamine indazole. The structural formulas of 5-nitroindazole and 1-methyl-5-nitro-indazole, respectively, are as follows:



5-nitroindazole may be prepared as follows:

2 parts by weight of 5-nitro-2-amino-toluene dissolved in 100 parts of acetic acid are treated at 25° C. with a concentrated aqueous solution containing 0.91 part of sodium nitrite. The resulting solution is allowed to stand for a day and is then concentrated nearly to dryness. The residue is washed well with water to remove the remaining acetic acid. The product is obtained in pure form by recrystallization from dilute methyl alcohol, and melts at 206–208° C.

1-methyl-5-nitroindazole is prepared as follows:

5.6 parts by weight of 5-nitro-indazole are suspended in a solution of 1.5 parts of sodium hydroxide in 40 parts of water. With good stirring, 5.1 parts of dimethyl sulfate are added slowly. The temperature is maintained at 25–35° C. and the time required for adding the dimethyl sulfate is approximately two hours. The reaction mixture is always kept slightly alkaline by small additions of 5% alkali, when necessary.

The compounds 5-p-toluene-sulfonamido-indazole, 5-benzoylacetamino-indazole, and 5-p-nitrobenzoylamino-indazole are obtained by reduction of 5-nitroindazole and subsequent treatment with the suitable acid chloride. The compound 5-benzoylacetamino-indazole is best prepared by heating 5-amino-indazole with ethyl benzoyl acetate to 165° C.–175° C. and distilling off the alcohol generated during the course of the reaction. The compound 5-amino-indazole is prepared by simple reduction of 5-nitro-indazole.

The following examples, which are illustrative only, indicate developing formulae using nitro derivatives of indazole according to our invention.

Example 1

A black and white developer is made as follows:

Monomethyl-p-aminophenol sulfate	grams	1
Hydroquinone	do	5
Sodium sulfite	do	30
Sodium carbonate	do	30
Potassium bromide	do	.5
5-nitroindazole	do	.1
Water to	liter	1

In this formula the potassium bromide may be entirely omitted since its function is performed by the 5-nitroindazole.

Example 2

A developing solution for forming a colored image by coupler development is made as follows:

A. 2-amino-5-diethylaminotoluenehydrochloride	grams	1
Sodium sulfite	do	10
Sodium carbonate	do	30
Water to	cc	1000
B. m-Hydroxydiphenyl	grams	2
1-methyl-5-nitroindazole	do	.2
Water to	cc	100

In use, B is added to A. This developer produces a blue-green dye on development of an exposed silver halide layer. The amount of the indazole derivative used in developers either in black and white or in color developers may vary

from about .005 gram to .50 gram per liter or higher.

We consider as within our invention all equivalents and modifications coming within the scope of the appended claims.

We claim:

1. A color-forming photographic developer comprising a primary aromatic amino developing agent, a coupler compound, and 5-nitroindazole.

2. A color-forming photographic developer comprising a primary aromatic amino developing agent, a coupler compound, and 1-methyl-5-nitroindazole.

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