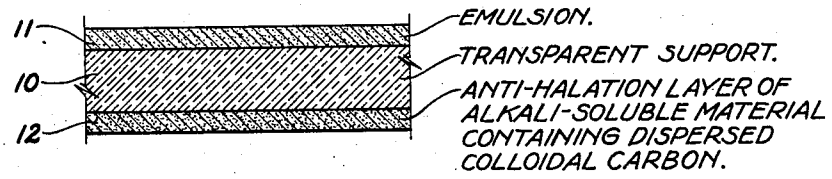
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COLLOIDAL CARBON ANTIHALATION LAYER

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COLLOIDAL CARBON ANTIHALATION LAYER

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This invention relates to photographic film and more particularly to a backing for such film for the purpose of reducing halation.

The problem of preventing halation in photographic elements is a well known one and various means have been designed to overcome this phenomenon. Halation occurs when a light-sensitive film, plate or paper is exposed to a well lighted subject and the surface of the material, opposite that first reached by the light rays, does not contain a light-absorbing material. Light rays are then reflected onto the sensitive material from the support and produce the effect known as halation. This is ordinarily overcome by applying a light-absorbing material on one of the surfaces of the support, usually the rear surface, so that rays which would otherwise be reflected onto the sensitive layer are thereby absorbed. It is usually desirable for the light-absorbing material of the anti-halation layer to absorb light to which the emulsion layer is sensitive and, in the case of panchromatic or multicolor elements, the anti-halation layer should absorb light throughout the visible spectrum. It is frequently impossible to obtain a dye having these properties and materials such as carbon have, therefore, been proposed for use in anti-halation layers. One of the disadvantages in using carbon for this purpose, however, is that carbon is difficult to disperse in the anti-halation layer in sufficiently finely-divided form and when suitably dispersed the backing layer cannot be removed in the alkaline photographic baths.

It is, therefore, the principal object of the present invention to provide an anti-halation layer of colloidal carbon or carbon black which is finely dispersed in a supporting medium and which can readily be removed in alkaline photographic developers. A further object is to provide an anti-halation layer which dissolves smoothly in photographic developers and does not disintegrate and contaminate the developer. Other objects will appear from the following description of our invention.

These objects are accomplished by using as the anti-halation layer an alkali-soluble material such as an alkali-soluble cellulose ester or synthetic resin having colloidal carbon dispersed therein with a water-insoluble or water-soluble dispersing agent.

In the accompanying drawing the single figure is a sectional view of a photographic film having an anti-halation layer according to our invention.

The material which we propose to use as an anti-halation backing for photographic elements comprises as a supporting material an alkali-soluble material. This material may be a cellulose ester, especially a cellulose dicarboxylic acid ester, such as cellulose acetate phthalate or cellulose acetate propionate maleate. Water insoluble synthetic resins may also be used, such as polyvinyl phthalate or polyvinyl acetate phthalate. In this alkali-soluble material there is dispersed carbon black or colloidal carbon in the presence of a dispersing agent which maintains the carbon in finely-divided form in the water-insoluble material.

Any suitable dispersing agent may be used in the colloidal carbon dispersion, but we prefer to use water-insoluble metallic soaps such as those described in U. S. Patents 2,173,444 and 2,173,445. Suitable water-soluble dispersing agents are Aerosols, which are sulfonated esters of dicarboxylic acids, and Novonacco, which is a modified sodium alkyl naphthalene sulfonate.

In accordance with our invention, carbon black in the form of a paste, such as that described in Sweitzer U. S. Patent 1,987,980, granted January 15, 1935, which contains as a dispersing agent a copper salt such as copper oleate, stearate or resinate, is used as the starting material for preparing an anti-halation backing. Dry carbon black of fine particle size may also be used in the form of a mixture with water containing a dispersing agent and a small amount of alkali. This mixture is run through a colloidal mill to form a smooth paste. The colloidal carbon paste obtained by either method is then mixed with an organic solvent and added to the water-insoluble cellulose ester or synthetic resin dissolved in organic solvents which is thereby used as the supporting medium. Suitable examples are as follows:

Example 1

The following mixtures are prepared:

A

Polyvinyl phthalate	grams	160
Acetone	cc	700
Methyl alcohol	cc	700

B

Colloidal carbon paste	grams	80
Water	cc	400
Cellosolve	cc	700

The colloidal carbon is first thoroughly dispersed in the mixture of water and Cellosolve by means of a colloid mill. Solution A is then added to dispersion B and the resulting mix-

ture run through a colloid mill until a good dispersion of the carbon black is obtained. The final dispersion is then diluted with methyl alcohol to the desired coating consistency. If the above dispersion is mixed with about 1500 cc. of methyl alcohol a satisfactory coating dope is obtained.

Example 2

Carbon black	grams	15
Emulphor O (A polyethylene-glycol condensation product)	grams	9
Polyvinyl acetate phthalate	do	120
Denatured ethyl alcohol	cc.	2,500

The carbon black is mixed with a dispersing agent in 500 cc. of alcohol to form a paste. The polyvinyl acetate phthalate is dissolved in 400 cc. of alcohol and this solution is added to the paste and the mixture passed several times through a paint mill or colloid mill to prepare the final carbon dispersion. This dispersion may be diluted for coating if desired.

"Emulphor O" is a water-soluble dispersing agent, but is also soluble in organic solvents, as shown in Example 2. This dispersing agent can also be used to make first a dispersion of carbon black in water with the aid of a paint mill or colloid mill, and the organic solvents added later.

Our invention will now be described with particular reference to the accompanying drawing.

As shown in the drawing, a support 10 of any suitable material such as cellulose nitrate, cellulose acetate, cellulose acetate propionate or synthetic resin is coated with an emulsion layer 11 or with suitable subbing layers between the support 10 and the emulsion layer 11, and with the anti-halation layer 12 consisting of an alkali-soluble material containing the dispersed colloidal carbon.

When film backed with a material of the nature described above is placed in a developer or an alkaline pre-bath, the coating will be dissolved by the alkali, releasing the carbon black which can be completely removed from the back of the film by a jet of water if it has not already been removed by the agitation of the film in the developer or pre-bath.

The layers coated according to our invention dissolve smoothly in photographic developers and do not disintegrate and come off in large pieces as frequently happens with backings containing dye absorption media. It has further been found that anti-halation layers containing dispersed carbon black possess considerably lower electrical resistance than corresponding layers with carbon omitted or replaced by dyes. Backing layers, according to our invention, have, therefore, advantages as anti-static layers in addition to their value as anti-halation backings.

It is to be understood that various modifications may be made in the examples described herein and that our invention is to be taken as limited only by the scope of the appended claims.

We claim:

1. A photographic element comprising a support having thereon a sensitive emulsion layer and an anti-halation layer of an alkali-soluble synthetic colloidal material containing colloidal carbon dispersed therein with a dispersing agent.

2. A photographic element comprising a transparent support having on one side thereof a sensitive emulsion layer and on the opposite side an anti-halation layer of an alkali-soluble synthetic colloidal material containing colloidal carbon dispersed therein with a dispersing agent.

3. A photographic element comprising a transparent support having on one side thereof a sensitive emulsion layer and on the opposite side an anti-halation layer of an alkali-soluble cellulose ester containing colloidal carbon dispersed therein with a water insoluble dispersing agent.

4. A photographic element comprising a transparent support having on one side thereof a sensitive emulsion layer and on the opposite side an anti-halation layer of an alkali-soluble dicarboxylic acid ester of cellulose containing colloidal carbon dispersed therein with a water-insoluble dispersing agent.

5. A photographic element comprising a transparent support having on one side thereof a sensitive emulsion layer and on the opposite side an anti-halation layer of cellulose acetate phthalate containing colloidal carbon dispersed therein with a water insoluble dispersing agent.

6. A photographic element comprising a transparent support having on one side thereof a sensitive emulsion layer and on the opposite side an anti-halation layer of an alkali-soluble synthetic resin containing colloidal carbon dispersed therein with a water-insoluble dispersing agent.

7. A photographic element comprising a transparent support having on one side thereof a sensitive emulsion layer and on the opposite side an anti-halation layer of polyvinyl phthalate containing colloidal carbon dispersed therein with a dispersing agent.

8. A photographic element comprising a transparent support having on one side thereof a sensitive emulsion layer and on the opposite side an anti-halation layer of polyvinyl acetate phthalate containing colloidal carbon dispersed therein with a dispersing agent.

9. A photographic element comprising a support having on one side thereof a panchromatic gelatino silver halide emulsion layer and on the opposite side an anti-halation layer of an alkali-soluble dicarboxylic acid ester of cellulose containing carbon black dispersed therein with a water-insoluble metallic soap dispersing agent.

10. A photographic element comprising a support having on one side thereof a panchromatic gelatino-silver halide emulsion layer and on the opposite side an anti-halation layer of polyvinyl phthalate containing carbon black dispersed therein with a water-insoluble metallic soap dispersing agent.

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