

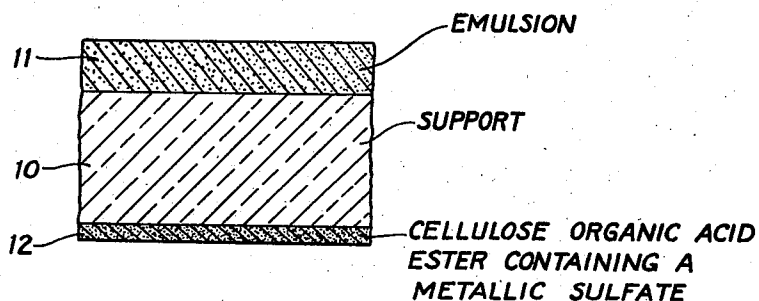
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ANTISTATIC FILM

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ANTISTATIC FILM

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3 Claims. (Cl. 95—9)

This invention relates to photographic film and particularly to a film protected against static.

The accumulation of electrical charges on photographic film has been the cause of considerable trouble. These charges are produced by the friction of the film moving over rollers or past the gates of a camera and are manifested as irregular fogged patterns in the emulsion of the film after it has been developed. These static effects are particularly noticeable in a film provided with a cellulose nitrate support, although with the advent of high speed emulsions practically any film support will become sufficiently electrified during manufacture or use so that the discharges of stored-up static electricity will affect the sensitive layer. Attempts have been made to overcome static in photographic films by the application of various layers to the film support. These layers have, in general, consisted of materials designed to dissipate the electric charges by providing the film with a conducting surface. Materials which absorb moisture and, therefore, provide a conducting surface have frequently been employed. These methods have not proven entirely satisfactory with the newer high speed emulsions and the absorption of water by the anti-static material is frequently objectionable.

It is, therefore, an object of the present invention to provide a novel photographic film backing which will afford static protection for the emulsion. A further object is to provide a means for coating photographic film to reduce its static tendency. Other objects will appear from the following description of our invention.

These objects are accomplished by incorporating a metallic sulfate in a layer of a cellulose organic acid ester applied to the film support. In the accompanying drawing the single figure is a sectional view of a film constructed according to our invention.

According to our invention a photographic film support of a cellulose inorganic acid ester such as cellulose nitrate or a cellulose organic acid ester, such as cellulose acetate or cellulose acetate butyrate, is coated with a layer of a cellulose organic acid ester containing a suitable amount of a metallic sulfate. Cellulose acetate is preferably used as the carrier for the metallic sulfate although other cellulose organic acid esters may be employed. A solution of the cellulose acetate containing the metallic sulfate is coated on the film support from solvent solution in the conventional manner. The anti-static layer is preferably on the rear surface of the support or the

side not carrying the sensitive emulsion layer although the anti-static layer may be coated on the support and the sensitive emulsion layer coated over it. After the anti-static layer has been applied, a sensitive layer such as the usual gelatino-silver halide emulsion layer may be applied to the support.

Any suitable metallic sulfate may be used in the anti-static layer. We prefer to use aluminum sulfate although other metallic sulfates such as magnesium sulfate, cadmium sulfate and sodium sulfate may be employed.

We advance no theory to explain why the metallic sulfate is effective in reducing static. The aluminum sulfate hydrate which we prefer to use is not hygroscopic; hence the beneficial static results do not depend upon the absorption of moisture by the backing. Furthermore, the surface resistivities of the backed and unbacked films are not greatly different. In other words the salt does not modify the electrical resistivity of the film. This is true of both volume and surface resistivities.

We have found that the incorporation of the metallic sulfate in the backing has little or no static effect until a certain threshold concentration has been reached. Beyond this point the beneficial results increase in proportion to the concentration of the salt up to the point at which the salt is no longer compatible with the backing. For aluminum sulfate the amounts which may be used vary from 1.0% to 40% of the amount of cellulose acetate or other cellulose organic acid ester in the finished coating.

The following examples illustrate the method of applying the antistatic backing according to our invention:

Example 1

A cellulose acetate butyrate film support is coated with an anti-static layer from the following solution:

	Per cent
Cellulose acetate	3
Aluminum sulfate ($\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$)	.65
Water	1.5
Methyl alcohol	37.85
Acetone	57

This coating is dried and a gelatino-silver halide emulsion layer is then applied to the opposite side of the support.

The concentration of salt may be varied between about .01% and 2.0% depending on variations in the viscosity of the cellulose acetate. The concentrations of the other components are not

critical and may vary according to the individual salt and cellulose ester selected.

Example 2

A cellulose nitrate film support is coated by bead application at approximately 10 feet per minute with the following solution:

	Per cent
Cellulose acetate.....	3
Methyl alcohol.....	40
Acetone.....	56
Aluminum sulfate ($\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$).....	1

Our invention will be further illustrated by reference to the accompanying drawing. As shown therein, a support 10 of cellulose ester is coated on one side with an emulsion layer 11 and on the opposite side with a layer 12 of cellulose organic acid ester containing a metallic sulfate.

It will be understood that our invention is capable of numerous variations and is to be taken as limited only by the scope of the appended claims.

We claim:

1. An anti-static photographic film comprising a cellulose ester support having thereon a sensitive emulsion layer and a layer of an organic acid ester of cellulose containing aluminum sulfate in amount compatible with said cellulose organic acid ester layer.
2. An anti-static photographic film comprising a cellulose ester support having thereon a sensitive emulsion layer and a layer of an organic acid ester of cellulose containing from 1.0% to 40% of aluminum sulfate.
3. An anti-static photographic film comprising a cellulose acetate support having thereon a sensitive emulsion layer and a layer of an organic acid ester of cellulose containing from 1.0% to 40% of aluminum sulfate.

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