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(54) **Light-sensitive photographic film with a self-supporting plastics film coated with a copolymeric subbing layer, and process for their production.**

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Light-sensitive photographic film with a self-supporting plastics film coated with a copolymeric subbing layer, and process for their production

The present invention relates to a light-sensitive photographic film and to a process for its production.

The adhesion of light-sensitive photographic emulsions applied directly to the surface of a plastics support film is generally inadequate to withstand the conditions of handling and treatment to which photographic films are subjected. In order to provide acceptable adhesion it has become common practice in the photographic art to interpose two or more subbing layers between the support film and the light-sensitive photographic emulsion. The subbing layers of typical conventional photographic films generally comprise, outwardly from the support film, a copolymeric subbing layer and a gelatinous subbing layer, a light-sensitive photographic emulsion such as a gelatinous emulsion containing a light-sensitive silver halide being adhered to the gelatinous subbing layer.

GB 1 001 716 describes certain emulsion copolymers of alkyl esters of α, β ethylenically unsaturated monocarboxylic acids, especially copolymers with a monoalkyl ester of itaconic acid including half esters of itaconic acid. The alkyl esters of α, β ethylenically unsaturated monocarboxylic acids may be chosen from soft comonomers such as ethyl acrylate and hard comonomers such as methyl methacrylate, whilst the preferred copolymers contain at least some hard and at least some soft comonomer. Various end uses for the copolymers are described such as coating uses including the coating of metal, cellulosic, masonry and plastic substrates. It is also contemplated that the copolymers may be used as subbing layers for the light-sensitive portion of a lithographic printing plate.

GB 1 146 215 describes a subbing layer for photographic films which includes a subbing copolymer comprising:

a) an unsaturated ester of monocarboxylic acid examples of which are alkyl acrylates and methacrylates,

b) an aliphatic polyfunctional compound containing at least two sites of carbon-carbon unsaturation at least one of which is an allyl or vinyl group, or glycidyl acrylate, glycidyl methacrylate, a methacrylate ester in which the alcohol portion of the ester has a free hydroxy group, or fumaric acid, and

c) itaconic acid, fumaric acid, acrylic acid or methacrylic acid provided that c) is itaconic acid when b) is fumaric acid.

DE-OS 2 409 969 describes an adhesive subbing layer for a photographic film comprising a copolymer of at least one acrylic monomer selected from alkyl esters of acrylic acid and alkyl esters of methacrylic acid and an ethylenically unsaturated comonomer having a specified structure such as esters, amides, imides and the like of certain acids which include itaconic acid. Optional comonomers include itaconic acid. The coating composition is applied to the film support surface such that the amount of solid copolymer applied is preferably in the range of 0.05 to 5 g/m² (0.5 to 50 mg/dm²).

US 2 698 235 describes photographic subbing copolymers derived from vinylidene chloride, an acrylic ester and itaconic acid. Adhesion of a photographic emulsion directly to the copolymer subbing layer with the elimination of the usual gelatin sublayer is contemplated.

Whilst the benefits, such as simplification of the coating process, which would result from the elimination of one or more of the subbing layers have been recognised in the art. Applicants are not aware of any proposals which have resulted in successful commercial exploitation.

Applicants have now discovered that photographic emulsions adhere directly to a specific class of subbing copolymers without the interposition of a gelatinous subbing layer.

According to the present invention a light-sensitive photographic film comprises a self-supporting plastics film, a copolymeric subbing layer applied to at least one surface thereof, and a light-sensitive photographic emulsion layer bonded directly to the copolymeric subbing layer, characterised in that said copolymeric subbing layer comprises a copolymer prepared from a comonomer mixture comprising 35 to 55 mole % acrylic acid or a lower alkyl ester thereof in which the alkyl group comprises up to 8 carbon atoms, 35 to 55 mole % methacrylic acid or a lower alkyl ester thereof in which the alkyl group comprises up to 8 carbon atoms, and 1 to 15 mole % of itaconic acid, a half ester of itaconic acid or itaconic anhydride, said copolymeric subbing layer having a dry coat weight in the range 0.05 to 3.00 mg/dm².

Also according to the present invention, a process for the production of a light-sensitive photographic film comprises coating at least one surface of a self-supporting plastics film with a subbing composition comprising an aqueous dispersion or a solution in an organic solvent of a copolymer prepared from a comonomer mixture comprising 35 to 55 mole % acrylic acid or a lower alkyl ester thereof in which the alkyl group comprises up to 8 carbon atoms, 35 to 55 mole % methacrylic acid or a lower alkyl ester thereof in which the alkyl group comprises up to 8 carbon atoms, and 1 to 15 mole % of itaconic acid, a half ester of itaconic acid or itaconic anhydride, causing or allowing the coating to dry to a layer having a coat weight in the range 0.05 to 3.00 mg/dm² and coating the dried subbing layer directly with a light-sensitive photographic emulsion.

According to this invention, light-sensitive

photographic emulsions are adhered directly to the copolymeric subbing layer, i.e. adequate emulsion adhesion under conventional conditions for handling and treating photographic films is achieved by coating the photographic emulsion layer in face-to-face contact with the copolymeric subbing layer and without the need for an interposed gelatinous subbing layer or any treatment or surface modification of the copolymeric subbing layer, such as corona discharge treatment as described in British patent specification 1 259 506.

The self-supporting plastics film may consist of a cellulose ester such as cellulose triacetate or any suitable thermoplastics film which is preferably biaxially oriented, such as films of polysulphones, polystyrene and linear polyesters which may be obtained by condensing one or more dicarboxylic acids or their lower alkyl diesters, e.g. terephthalic acid, isophthalic, phthalic, 2,5-, 2,6- and 2,7-naphthalene dicarboxylic acid, succinic acid, sebacic acid, adipic acid, azelaic acid, diphenyl dicarboxylic acid, and hexahydroterephthalic acid or bis-p-carboxyl phenoxy ethane, optionally with a monocarboxylic acid, such as pivalic acid, with one or more glycols, e.g. ethylene glycol, 1,3-propanediol, 1,4-butanediol, neopentyl glycol and 1,4-cyclohexanedimethanol. Biaxially oriented and heat-set films of polyethylene terephthalate are particularly useful for the production of the photographic films according to this invention. Such self-supporting thermoplastics films may be transparent and light-transmitting, optionally including photographically inert dyestuffs, e.g. blue dyestuffs for X-ray films, or may be rendered opaque by the addition of additives, such as pigments and fillers, and may in particular have a white and paper-like texture which may be achieved by the addition of suitable fillers and/or by voiding. The white and paper-like films may be used as bases for photographic prints. Films suitable for use in "instant" photography may be pigmented black with carbon black particles.

The lower alkyl (up to 8 carbon atoms in the alkyl group) esters of acrylic and methacrylic acid as comonomers of the subbing copolymer may comprise the methyl, ethyl, propyl, isopropyl, butyl, pentyl, hexyl, heptyl, n-octyl and 2-ethylhexyl esters, the preferred esters being ethyl acrylate and methyl methacrylate.

Itaconic acid is particularly effective as the third comonomer. Half esters of itaconic acid wherein one carboxylic acid group is esterified are also effective comonomers. It has been found that the use of itaconic acid, a half ester of itaconic acid or itaconic anhydride as comonomers in the subbing copolymer is effective not only in providing the desired adhesive properties of the photographic emulsion applied thereto but also in enhancing the wetting of the plastics film during the application of the subbing composition.

Stronger adhesion of light-sensitive photographic emulsions to the subbing layer is achieved when the subbing copolymer is prepared from a comonomer mixture containing a molar excess of itaconic acid, a half ester of itaconic acid or itaconic anhydride such that free unpolymerised acid, half ester or anhydride is present in the subbing layer. Stronger dry adhesions are obtained with at least 1.0% by weight of free itaconic acid, half ester or itaconic acid, or itaconic anhydride based on the weight of the copolymer.

The subbing copolymer, may if desired, be derived from four or more comonomers, the additional comonomers being employed to modify such properties as dry adhesion and being present in the copolymer in an amount comprising up to 8 mole %. Suitable additional comonomers include acrylamide, methacrylamide, N-methylol acrylamide, N-ethanol acrylamide, N-propanolacrylamide, N-methylol methacrylamide, N-ethanol methacrylamide, N-methyl acrylamide, N-tertiary-butylacrylamide, acrylonitrile, halo-substituted acrylonitrile and methacrylonitrile, dimethylaminoethyl-methacrylate.

Proportions in the range 35 to 55 mole % of acrylic acid or a lower alkyl ester (up to 8 carbon atoms in the alkyl group) thereof and 35 to 55 mole % of methacrylic acid or a lower alkyl ester (up to 8 carbon atoms in the alkyl group) thereof are effective in providing satisfactory adhesions to light-sensitive photographic emulsions; smaller or greater proportions result in weaker adhesion. Optimum adhesions to conventional photographic emulsions are achieved with preferred proportions of acrylic acid or the lower alkyl ester (up to 8 carbon atoms in the alkyl group) thereof in the range 42 to 50 mole % and of methacrylic acid or the lower alkyl ester (up to 8 carbon atoms in the alkyl group) thereof in the range 44 to 55 mole %.

Ethyl acrylate and methyl methacrylate are particularly effective comonomers and provide satisfactory subbing properties when both are copolymerised together with itaconic acid. Particularly beneficial subbing properties and especially adhesion to photographic emulsions are achieved with subbing copolymers consisting of 43 to 50 mole % ethyl acrylate, 45 to 53 mole % methyl methacrylate and 4 to 10 mole % of itaconic acid.

The subbing copolymer may be prepared by conventional emulsion polymerisation techniques in water in the presence of a suitable emulsifying agent or a mixture of emulsifying agents. The total amount of emulsifying agent can influence the adhesion of photographic emulsions to the copolymeric subbing layer and it is therefore preferred to employ up to 5% by weight of emulsifying agent based on the total weight of the comonomers and preferably about 4% by weight. Anionic emulsifying agents such as unbranched sodium dodecyl benzene sulphonate, which is available commercially as 'Nansa' 1106 provide particularly

good adhesions to photographic emulsions which may if desired be used in admixture with other emulsifying agents. 'Nansa' is a registered Trade Mark.

Conventional additives such as adhesion promoters, slip and anti-static agents may be included in the copolymeric subbing composition in amounts not exceeding 10% by weight based upon the weight of the subbing copolymer, since larger amounts may adversely affect the adhesion of photographic emulsions.

When the self-supporting thermoplastics film is an oriented film, e.g. a biaxially oriented film of polyethylene terephthalate, the subbing composition may be applied to the film before, during or after the stretching process employed to achieve orientation. A convenient procedure is to coat the film between the two stretching operations which are applied in mutually perpendicular directions to orient the film, particularly as this enhances the adhesion between the film and the subbing layer.

The procedure for applying the subbing composition may be any of the known coating techniques, such as dip coating, bead coating, reverse roller coating, air knife, direct gravure or slot coating and the composition may be applied as an aqueous latex or solution or as a solution in an organic solvent.

The pH of the subbing composition should preferably be in the range 2.0 to 5.0 and most preferably 2.5 to 3.0. Whilst coating quality is better with pHs up to 7, it has been found that a satisfactory combination of adhesion and coating quality is obtained in the range 2.5 to 3.0.

It is preferred that the subbing copolymer should comprise from 2 to 10% by weight and particularly 5% by weight of the subbing composition since compositions of such concentration dry slowly and provide subbing layers of uniform coating quality having particularly satisfactory adhesions to photographic emulsions.

The dried copolymeric subbing layer has a coat weight in the range 0.05 to 3.00 mg/dm^2 and most preferably 0.5 to 1.00 mg/dm^2 for optimum adhesion to photographic emulsions. Such coat weights may be accomplished by appropriate modifications to the concentration of the subbing composition and/or the conditions of coating.

The copolymeric subbing layers applied according to this invention to linear polyester films such as polyethylene terephthalate films are such that the film base, i.e. the polyester film carrying the copolymeric subbing layer but not the light-sensitive photographic emulsion, is suitable for recycling through the film-forming extruder and stretching equipment.

Any suitable light-sensitive photographic emulsion such as a conventional gelatinous silver halide emulsion, may be applied by conventional techniques directly to the subbing layer. Alternative light-sensitive emulsions based upon binding resins other than gelatin, e.g. those binding resins described in United States patent 4 033 772, may also be applied with good adhesion to the subbing copolymer layers of this invention. Such emulsions may contain any of the conventional additives. It has been found that light-sensitive photographic emulsions bond with good adhesion after direct application to the surface modified layer.

Light-sensitive photographic emulsions, such as conventional gelatinous silver halide X-ray and graphic arts emulsions, adhere to the copolymeric subbing layers with good adhesions before and after accelerated ageing by incubation when evaluated by the tests described below.

The tests referred to in this specification were effected as follows:

Dry adhesion refers to the adhesion of a gelatinous silver halide emulsion via the copolymeric subbing layer to the self-supporting thermoplastics film in the final photographic film after incubation at 50°C and 75% relative humidity for 16 hours, assessed, both before and after processing in standard photographic chemicals, by sticking a self-adhesive tape along the torn edge of the film and rapidly separating the tape from the film. The adhesion of the emulsion was graded in five progressive grades 1 to 5, Grade 1 being when no emulsion was removed after 8 separations of the adhesive tape and Grade 5 being when all the emulsion was removed with one separation of the tape.

Wet adhesion refers to the adhesion of a gelatinous silver halide emulsion via the copolymeric subbing layer to the self-supporting thermoplastics film in the final photographic film, assessed, after processing in the standard photographic chemicals and washing in water for 15 minutes by rubbing with a sponge over a series of lines scored in the still wet emulsion. The adhesion of the emulsion was graded in five progressive grades 1 to 5, Grade 1 being when no emulsion was removed by rubbing 10 times over the scored lines and Grade 5 being when all of the emulsion was removed by rubbing 10 times.

The invention is further illustrated by the following examples.

Examples 1 to 19

The subbing compositions for each Example were prepared in batches by conventional emulsion polymerisation in water, the comonomers and other polymerisation ingredients and the quantities employed being shown in Tables 1 to 3 together with the amount of unpolymerised acid in % by weight based on the weight of the copolymer and the pH of the latices.

A polyethylene terephthalate film was melt extruded and quenched to the amorphous state on a cooled rotating drum. The resulting film was stretched in the direction of extrusion to 3.0 times its original length. It was then coated on one side with the aqueous subbing composition described in each of the Examples and

passed into a stenter oven where the coating was dried. In each Example the coating composition, which was applied by a roller coating technique, contained 5% by weight of the subbing copolymer based on the total weight of the composition. The dried coated film was then stretched sideways 3.0 times its original width and finally heat set at the temperature of 220°C. The resulting films had an overall thickness of 100 microns and the dry coat weights of the applied subbing are shown in Tables 1 to 3.

A conventional aqueous gelatinous silver halide emulsion was applied directly to the subbing layers and tested for dry and wet adhesions by the procedures described above, the adhesions also being shown in Tables 1 to 3. The measured adhesions between the emulsion layers and the subbing layers are sufficient to resist the conditions of handling and treatment, including wet processing, to which photographic films are normally subjected.

The subbing layers described in the above Examples provided satisfactory adhesions to other photographic emulsions including modified X-ray emulsions.

TABLE 1

Example	Comonomers and mole % in polymerisation mixture			Emulsifying agent and amount — weight % based on total weight of comonomers	Catalyst and amount — weight % based on total weight of comonomers	pH	Amount of free acid in subbing composition — % by weight based on weight of copolymer	Dry coat weight of subbing layer mg/dm²	Dry adhesion	Wet adhesion
	Ethyl acrylate	Methyl methacrylate	Itaconic acid							
1	46.6	50.4	3.0	'Nansa' 1106 1.9	None	2.7	0.7	0.5	2	1
2	43.2	52.1	4.7	'Nansa' 1106 1.9	Potassium persulphate 1.0	2.7	1.0	1.0	2	1
3	46.5	48.4	5.1	'Nansa' 1106 3.8	,,	2.7	1.1	1.0	3	1
4	43.2	52.1	4.7	'Nansa' 1106 3.4	,,	2.7	1.0	1.0	3	1
5	43.2	52.1	4.7	'Nansa' 1106 3.6	,,	2.7	1.0	1.0	2	1
6	49.2	45.9	4.9	'Nansa' 1106 4.8	,,	2.7	1.2	0.5	3	1
7	44.2	46.6	9.2	'Nansa' 1106 3.9	,,	7.0	1.8	1.0	3	1

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TABLE 1 (Continued)

Example	Comonomers and mole % in polymerisation mixture			Emulsifying agent amd amount – weight % based on total weight of comonomers	Catalyst and amount – weight % based on total weight of comonomers	pH	Amount of free acid in subbing composition – % by weight based on weight of copolymer	Dry coat weight of subbing layer mg/dm²	Dry adhesion	Wet adhesion
	Ethyl acrylate	Methyl methacrylate	Itaconic acid							
8	44.2	46.6	9.2	'Nansa' 1106 3.9	Potassium persulphate 1.0	2.5	1.8	1.1	1	1
9	45.6	45.6	8.8	'Aerosol' OT 3.2 'Nansa' 1106 0.56	,,	2.7	1.6	1.0	1	1
10	44.8	46.6	8.6	'Aerosol' OT 3.2 'Nansa' 1106 0.5	,,	2.7	1.6	1.0	2	1
11	44.2	46.6	9.2	'Nansa' 1106 3.9	,,	2.5	1.8	0.6	1	1

TABLE 2

Example	Comonomers and mole % in polymerisation mixture			Emulsifying agent and amount — weight % based on total weight of comonomers	Catalyst and amount — weight % based on total weight of comonomers	pH	Amount of free acid, itaconate or anhydride in subbing composition — % by weight based on weight of copolymer	Dry Coat weight of subbing layer mg/dm²	Dry adhesion	Wet adhesion
12	Methyl acrylate 44.0	Methyl methacrylate 47.0	Itaconic acid 9.0	'Nansa' 1106 1.5	Potassium persulphate 1.0	2.9	1.9	0.75	1	1
13	n-Butyl acrylate 44.0	Methyl methacrylate 47.0	Itaconic acid 9.0	,,	,,	2.8	4.7	0.75	1	1
14	Ethyl acrylate 44.0	Ethyl methacrylate 47.0	Itaconic acid 9.0	,,	,,	2.9	4.0	0.75	1	1
15	Ethyl acrylate 44.0	n-Butyl methacrylate 47.0	Itaconic acid 9.0	,,	,,	2.8	5.0	0.75	1	1
16	Ethyl acrylate 45.0	Methyl methacrylate 45.0	Monoethyl itaconate 10.0	,,	,,	2.9	2.9	1.0	4	1
17	Ethyl acrylate 43.6	Methyl methacrylate 45.9	Itaconic anhydride 10.5	'Nansa' 1106 1.4	,,	3.0	not measured	1.0	1	1
18	Ethyl acrylate 38.6	Methyl methacrylate 52.1	Itaconic anhydride 9.3	,,	,,	3.0	not measured	1.0	1	1

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TABLE 3

Example	Comonomers and mole % in polymerisation mixture	Emulsifying agent and amount – weight % based on total weight of comonomers	Catalyst and amount – weight % based on total weight of comonomers	pH	Amount of free acid, itaconate or anhydride in subbing composition – % by weight based on weight of copolymer	Dry Coat weight of subbing layer mg/dm²	Dry adhesion	Wet adhesion
19	Ethyl acrylate 45.0 Methyl methacrylate 45.0 Itaconic acid 8.0 Acrylamide 2.0	'Nansa' 1106 1.5 -	Potassium persulphate 1.0	3.6	2.2	0.75	1	1

Claims

1. A light-sensitive photographic film which comprises a self-supporting plastics film, a copolymeric subbing layer applied to at least one surface thereof, and a light-sensitive photographic emulsion layer bonded directly to the copolymeric subbing layer characterised in that said copolymeric subbing layer comprises a copolymer prepared from a comonomer mixture comprising 35 to 55 mole % acrylic acid or a lower alkyl ester thereof in which the alkyl group comprises up to 8 carbon atoms, 35 to 55 mole % methacrylic acid or a lower alkyl ester thereof in which the alkyl group comprises up to 8 carbon atoms, and 1 to 15 mole % of itaconic acid, a half ester of itaconic acid or itaconic anhydride, said copolymeric subbing layer having a dry coat weight in the range 0.05 to 3.00 mg/dm^2.

2. A light-sensitive photographic film according to claim 1, in which the self-supporting plastics film comprises a biaxially oriented and heat-set film of polyethylene terephthalate.

3. A light-sensitive photographic film according to claim 1 or 2, in which the subbing copolymer is prepared from a comonomer mixture which includes ethyl acrylate and methyl methacrylate.

4. A light-sensitive photographic film according to claim 1, 2 or 3, in which the subbing layer comprises at least 1.0% by weight based on the weight of the subbing copolymer of free unpolymerised itaconic acid, half ester of itaconic acid, or itaconic anhydride.

5. A light-sensitive photographic film according to any preceding claim, in which the subbing copolymer consists of 43 to 50 mole % ethyl acrylate, 45 to 53 mole % methyl methacrylate and 4 to 10 mole % of itaconic acid.

6. A light-sensitive photographic film according to any preceding claim, in which the dried coat weight of the subbing layer is 0.5 to 1.00 mg/dm^2.

7. A process for the production of a light-sensitive photographic film according to any of claims 1 to 6, which comprises coating at least one surface of the self-supporting plastics film with a subbing composition comprising an aqueous dispersion or a solution in an organic solvent of the subbing copolymer, causing or allowing the coating to dry to a layer having a coat weight in the range 0.05 to 3.00 mg/dm^2 and coating the dried subbing layer directly with a light-sensitive photographic emulsion.

8. A process according to claim 8, in which the self-supporting plastics film is biaxially oriented and the subbing composition is applied to the surface of the film between the two stretching operations employed to orient the film.

9. A process according to claim 8 or 9, in which the subbing composition has a pH in the range 2.5 to 3.0.

Revendications

1. Film photographique photosensible comportant une pellicule de matière plastique autoporteuse, une couche d'ancrage de type copolymère appliquée sur au moins une surface de cette pellicule et une couche d'émulsion photographique photosensible liée directement à la couche d'ancrage de type copolymère, caractérisé en ce que cette couche d'ancrage de type copolymère est constituée par un copolymère préparé à partir d'un mélange de comonomères renfermant de 35 à 55 moles % d'acide acrylique ou d'un ester d'alkyle inférieur de celui-ci dans lequel le groupe alkyle renferme jusqu'à 8 atomes de carbone, de 35 à 55 moles % d'acide méthacrylique ou d'un ester d'alkyle inférieur de celui-ci dans lequel le groupe alkyle renferme jusqu'à 8 atomes de carbone, et de 1 à 15 moles % d'acide itaconique, d'un hémi-ester d'acide itaconique ou d'anhydride itaconique, cette couche d'ancrage de type copolymère ayant un poids de revêtement à sec compris entre 0,05 et 3,00 mg/dm2.

2. Film photographique photosensible suivant la revendication 1, caractérisé en ce que la pellicule de matière plastique autoporteuse est constituée par une pellicule à orientation biaxiale stabilisée thermiquement en téréphtalate de polyéthylène.

3. Film photographique photosensible suivant la revendication 1 ou 2, caractérisé en ce que le copolymère d'ancrage est préparé à partir d'un mélange de comonomères qui renferme de l'acrylate d'éthyle et du méthacrylate de méthyle.

4. Film photographique photosensible suivant la revendication 1, 2 ou 3, caractérisé en ce que la couche d'ancrage comprend au moins 1,0 % en poids, sur la base du poids du copolymère d'ancrage, d'acide itaconique libre non polymérisé, d'hémi-ester d'acide itaconique ou d'anhydride itaconique.

5. Film photographique photosensible suivant l'une quelconque des revendications précédentes, caractérisé en ce que le copolymère d'ancrage renferme de 43 à 50 moles % d'acrylate d'éthyle, de 45 à 53 moles % de méthacrylate de méthyle et de 4 à 10 moles % d'acide itaconique.

6. Film photographique photosensible, suivant l'une quelconque des revendications précédentes, caractérisé en ce que le poids de revêtement séché de la couche d'ancrage va de 0,5 à 1,00 mg/dm2.

7. Procédé pour la production d'un film photographique photosensible suivant l'une quelconque des revendications 1 à 6, caractérisé en ce qu'on enduit au moins une surface de la pellicule en matière plastique autoporteuse avec une composition d'ancrage constituée par une dispersion aqueuse ou une solution dans un solvant organique du copolymère

d'ancrage, on provoque ou on permet le séchage du revêtement pour donner une couche ayant un poids de revêtement compris entre 0,05 et 3,00 mg/dm2 et on enduit directement la couche d'ancrage séchée avec une émulsion photographique photosensible.

8. Procédé suivant la revendication 7, caractérisé en ce que la pellicule de matière plastique autoporteuse est orientée biaxialement et en ce que la composition d'ancrage est appliquée sur la surface de la pellicule entre les deux opérations d'étirage utilisées pour orienter cette pellicule.

9. Procédé suivant la revendication 7 ou 8, caractérisé en ce que la composition d'ancrage à un pH compris entre 2,5 et 3,0.

Patentansprüche

1. Lichtempfindlicher fotografischer Film aus einer selbsttragenden Kunststoffolie, einer auf mindestens eine Oberfläche der selbsttragenden Kunststoffolie aufgebrachten, copolymeren Grundierschicht und einer lichtempfindlichen Fotoemulsionsschicht, die direkt mit der copolymeren Grundierschicht verbunden ist, dadurch gekennzeichnet, daß die copolymere Grundierschicht ein Copolymerisat enthält, das aus einer Comonomerenmischung, die aus 35 bis 55 Mol-% Acrylsäure oder eines niederen Alkylesters der Acrylsäure, bei dem die Alkylgruppe bis zu 8 Kohlenstoffatome enthält, 35 bis 55 Mol-% Methacrylsäure oder eines niederen Alkylesters der Methacrylsäure, bei dem die Alkylgruppe bis zu 8 Kohlenstoffatome enthält, und 1 bis 15 Mol-% Itaconsäure, eines Halbesters der Itaconsäure oder Itaconsäureanhydrid besteht, hergestellt worden ist, wobei die copolymere Grundierschicht im trockenen Zustand ein Flächengewicht von 0,05 bis 3,00 mg/dm² hat.

2. Lichtempfindlicher fotografischer Film nach Anspruch 1, bei dem die selbsttragende Kunststoffolie aus einer biaxial orientierten und heißfixierten Polyäthylenterephthalatfolie besteht.

3. Lichtempfindlicher fotografischer Film nach Anspruch 1 oder 2, bei dem das Copolymerisat der Grundierschicht aus einer Äthylacrylat und Methylmethacrylat enthaltenden Comonomerenmischung hergestellt worden ist.

4. Lichtempfindlicher fotografischer Film nach Anspruch 1, 2 oder 3, bei dem die Grundierschicht mindestens 1,0 Gew.%, auf das Gewicht des Copolymerisats der Grundierschicht bezogen, freie, nicht polymerisierte Itaconsäure, freien, nicht polymerisierten Halbester der Itaconsäure oder freies, nicht polymerisiertes Itaconsäureanhydrid enthält.

5. Lichtempfindlicher fotografischer Film nach einem der vorhergehenden Ansprüche, bei dem das Copolymerisat der Grundierschicht aus 43 bis 50 Mol-% Äthylacrylat, 45 bis 53 Mol-% Methylmethacrylat und 4 bis 10 Mol-% Itaconsäure hergestellt worden ist.

6. Lichtempfindlicher fotografischer Film nach einem der vorhergehenden Ansprüche, bei dem die Grundierschicht im trockenen Zustand ein Flächengewicht von 0,5 bis 1,00 mg/dm² hat.

7. Verfahren zur Herstellung eines lichtempfindlichen fotografischen Films nach einem der Ansprüche 1 bis 6, bei dem mindestens eine Oberfläche der selbsttragenden Kunststoffolie mit einer Grundiermasse beschichtet wird, die aus einer wäßrigen Dispersion des Copolymerisats der Grundierschicht oder aus einer Lösung des Copolymerisats der Grundierschicht in einem organischen Lösungsmittel besteht, bei dem man die Beschichtung unter Ausbildung einer Schicht, die ein Flächengewicht von 0,05 bis 3,00 mg/dm² hat, zum Trocknen bringt oder trocknen läßt und bei dem man die getrocknete Grundierschicht direkt mit einer lichtempfindlichen Fotoemulsion beschichtet.

8. Verfahren nach Anspruch 7, bei dem die selbsttragende Kunststoffolie biaxial orientiert wird und bei dem die Grundiermasse zwischen den zwei Reckvorgängen, die zur Orientierung der Kunststoffolie angewendet werden, auf die Oberfläche der Kunststoffolie aufgebracht wird.

9. Verfahren nach Anspruch 8 oder 9, bei dem die Grundiermasse einen pH-Wert im Bereich von 2,5 bis 3,0 hat.