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(71) Applicant: **KONICA CORPORATION**
26-2, Nishi-shinjuku 1-chome Shinjuku-ku
Tokyo(JP)

(72) Inventor: **Shimba, Satoru, Konica Corporation**
1 Sakura-machi
Hino-shi, Tokyo(JP)
Inventor: **Shimazaki, Hiroshi, Konica Corporation**
1 Sakura-machi
Hino-shi, Tokyo(JP)
Inventor: **Yamada, Yoshitaka, Konica Corporation**
1 Sakura-machi
Hino-shi, Tokyo(JP)

(74) Representative: **Henkel, Feiler, Hänzel & Partner**
Möhlstrasse 37
W-8000 München 80(DE)

(54) Silver halide color photographic light-sensitive material.

(57) A silver halide color photographic light-sensitive material is disclosed. The light-sensitive material comprises a support, a blue-sensitive, a green-sensitive and a red-sensitive layers, and the maximum sensitive wavelength of the red-sensitive λ_{Rmax}, the sensitivity of the red-sensitive layer S_{Rmax} to light of λ_{Rmax}, the sensitivity of the red-sensitive layer S_{R610} to light of 610nm, the maximum sensitive wavelength of the green-sensitive layer λ_{Gmax}, the sensitivity of the green-sensitive layer S_{Gmax} to light of λ_{Gmax}, and the sensitivity of the green-sensitive emulsion layer S_{G545} to light of 545nm, satisfy the following requirements, provided that the S_{R610}, S_{Rmax}, S_{G545} and S_{Gmax} are each determined based on a reciprocal of a ligh amount necessary for forming the optical density of 0.3 on the minimum density of the light-sensitive material after processing,

$590nm \leqq \lambda_{Rmax} \leqq 625nm$; $S_{R610} \geqq 0.8\ S_{Rmax}$,
$520nm \leqq \lambda_{Gmax} \leqq 570nm$; $S_{G545} \leqq 0.8\ S_{Gmax}$,

and at least one of layers included in the light-sensitive material contains a development inhibitor releasing coupler capable of releasing a development inhibitor or a development inhibitor precurser to form a development inhibitor. The development inhibiter split off from the coupler loses its development inhibiting ability at a rate of a half-life of not more than 4 hours in a color developer.

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FIELD OF THE INVENTION

The present invention relates to a silver halide color photographic light-sensitive material, and more particularly to a color photographic light-sensitive material which is capable of forming a color photographic image excellent in the color reproduction even under diverse exposure conditions to different light sources.

BACKGROUND OF THE INVENTION

Silver halide multilayer color photographic light-sensitive materials have lately been so improved as to provide remarkably high quality images. The three major factors of the image quality - graininess, sharpness and color reproducibility - are now all on a considerably high level; it seems that general customers have no large complaint to make about the photographic print or slide image quality.

However, of the above three factors, particularly as for the color reproducibility, the reproducibility of a color that is conventionally said hard to be photographically reproduced still remains not so much improved, although the color purity has been improved.

That is, there are still many insufficient aspects of the color reproducibility. For example, in the case of colors that reflect lights having longer wavelengths than 600 nm, including purple, blue-violet, greenish colors such as bluish-green and yellowish-green, the photographically reproduced colors are quite different from the original ones, which may disappoint customers. The principal factors influencing the color reproducibility are the spectral sensitivity distribution and the interimage effect of a color light-sensitive material.

The interimage effect, in a silver halide multilayer color photographic light-sensitive material, is effective to improve color-reproducing characteristics, particularly the color purity. The interimage effect can be obtained by a method of using a recently widely used diffusible DIR coupler containing an inhibitor group or its precursor having a high mobility. For a color negative film, there is a method capable of giving a similar effect to the interimage effect by using a colored coupler in an amount more than the amount necessary to cancel the useless absorption thereof.

However, the use of a colored coupler in an excessive amount increases the minimum density of a color light-sensitive film to thus make it very difficult to judge how to correct the color density at the time of making prints, which sometimes results in the deterioration of the color quality of finished prints. The interimage effect has the disadvantage that it is difficult to control its direction, so that the hue is liable to change, although the color purity can be raised. The control of the orientation of the interimage effect is described in U.S. Patent No. 4,725,529.

As a proposal for solving the above problem, Japanese Patent Publication Open to Public Inspection (hereinafter referred to as JP O.P.I.) No. 34541/1986 discloses a technique for combination of the spectral sensitivity distribution and the interimage effect.

The above techniques attempt to improve a color whose hue is hard to be reproduced in the above-mentioned color film and realize intended results to a certain extent. Representative one of the attempts is to bring into action not only the individual interimage effects of the conventional blue-sensitive, green-sensitive and red-sensitive layers but also the interimage effect from another light-sensitive layer having a principal wavelength different from those of these color-sensitive layers.

This technique, although effective to some extent to improve the hue reproducibility of a specific color, needs an interimage effect-generating layer and a different light-sensitive silver halide layer in addition to the conventional blue-sensitive, green-sensitive and red-sensitive layers in order to create the interimage effect, thereby increasing the amount of silver and the number of manufacturing processes, resulting in a high production cost. Besides, the effect of the technique cannot be deemed sufficient.

On the other hand, in order to improve the color reproducibility, it must also be considered to minimize the variation of the hue in the color reproduction according to different types of light sources used in photographing.

Regarding the problem of this kind, attention has conventionally been paid to the variation of color reproducibility due to changes in the color temperatures of light sources. To solve this problem, U.S. Patent No. 3,672,898 discloses a proper spectral sensitivity distribution for reducing the variation of color reproducibility according to types of light sources in photographing.

The above technique intends to minimize the variation of color reproducibility through reducing the changes in the sensitivities of the respective layers according to the changes in the color temperatures of light sources in photographing by making the spectral sensitivity distributions of the blue-sensitive and red-sensitive layers closer to that of the green-sensitive layer. In this instance, however, the three wave-length regions to which the layers are sensitive are located so near as to cause the spectral sensitivity distributions to overlap to result in the deterioration of the color purity. The color purity deterioration can, as is well-known, be prevented to some extent by enhancing the interimage effect with use of the aforementioned diffusible DIR coupler.

However, it has been found that even the combined use of the above techniques can not give any satisfactory color reproducibility when applied to photographing in a fluorescent light or under mixed lighting conditions using a fluorescent light and an electronic flash light. That is, when photographed in a fluorescent light alone, or even when photographed in an electronic flash light, if influenced by a fluorescent light, the resulting image appears to be greenish, particularly the flesh color is reproduced to be lifeless.

On the other hand, in the recent color light-sensitive materials for photographing use, as is well-known from the above-mentioned publications, diffusible DIR couplers are used for the purpose of improving the sharpness of color images by employing the edge effect and the color reproducibility by the interimage effect. Many of these diffusible DIR couplers, however, have the disadvantage that the development inhibitor released therefrom at the time of color developing is diffused from the light-sensitive material in processing and accumulated in the developer solution, and as a result, the developer solution shows a development inhibiting effect.

In the commercially prevalent process for continuously processing a vast number of light-sensitive materials, it is difficult to obtain an always consistent gradation, and the pollution of developer solutions by the development inhibitor released from diffusible DIR couplers is a serious problem.

Particularly, the pollution is a matter of the utmost concern in the midst of making efforts for reducing the replenishing amount of color developer solution from the emvironmental protection point of view.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a high-sensitivity color photographic light-sensitive material capable of giving a true color reproduction to photographing in a fluorescent light as well as in daylight.

It is another object of the invention to provide a color photographic light-sensitive material having an improved color reproducibility, particularly capable of truely reproducing greenish colors such as bluish-green and yellowish-green colors.

It is a further object of the invention to provide a color photographic light-sensitive material which does not pollute a color developer solution and is suitably processable in a processing method that uses a continuously recycled color developer solution.

The above objects of the invention are accomplished by a silver halide color photographic light-sensitive material comprising a support having thereon at least one blue-sensitive silver halide emulsion layer, at least one green-sensitive silver halide emulsion layer and at least one red-sensitive silver halide emulsion layer, in which

the maximum sensitivity wavelength λ_{Rmax}, the sensitivity to its wavelength S_{Rmax} and the sensitivity to a light of 610nm S_{R610} of said red-sensitive emulsion layer, and the maximum wavelength λ_{Gmax}, the sensitivity to its wavelength S_{Gmax} and the sensitivity to a light of 545nm S_{G545} of said green-sensitive emulsion layer satisfy the following conditions:

$590nm \leqq \lambda_{Rmax} \leqq 625nm$; $S_{R610} \geqq 0.8\ S_{Rmax}$,
$520nm \leqq \lambda_{Gmax} \leqq 570nm$; $S_{G545} \leqq 0.8\ S_{Gmax}$,

provided that said S_{Rmax}, S_{R610}, S_{Gmax} and S_{G545} each are a value of a reciprocal of an exposure amount necessary to form a Dmin + 0.3 density,

and at least one of layers included in the silver halide color light-sensitive material contains a development inhibitor releasing compound having a fragment comprised of a development inhibitor or development inhibitor precursor at the active site thereof, wherein said fragment is split off from said coupling active site by a color developing reaction and loses the development inhibiting ability thereof at a rate of a half-life of not more than 4 hours in a color developer solution.

DETAILED DESCRIPTION OF THE INVENTION

As for the color reproduction of photographs taken in a mixed lighting from different light sources, discussions have so far been made mainly on the color temperatures of light sources used, and a good number of techniques for improving the color reproducibility of light-sensitive materials have been proposed to date. In recent years, most of the illuminating lamps for daily life use are replaced by fluorescent lamps, and there are a lot of color troubles of finished prints that occurred when photographed in lighting with fluorescent lamps.

The major point of the trouble is such that the image of a photograph taken at a place illuminated by fluorescent lamps are excessively greenish, in which the photographed figures look lifeless. This is because the spectral intensity distribution in the visible region of a fluorescent light comprises a component having a continuously smooth curve form and a component having a bright line of a specific wavelength (specific line), so that the light appears to be white in the eye of a human being, but is sensed as a green-dominant and less reddish light by a color film. The three-wave fluorescent lamp, which is lately pervaded for household use, is a light source emitting a light dominated particularly by the bright line, so that when photographing is made in this light, the aforestated deviation of color is further increased.

It has been found by the inventors that where the spectral sensitivity distribution at a density of the minimum density (Dmin) + 0.3 of the green-sensitive and red-sensitive layers is formed so as to have the foregoing relations, the above problem can be largely improved.

As the preferred embodiment of the invention, in the spectral density $S_{R(\lambda)}$ of the red-sensitive layer in the Dmin + 0.3 density, the sensitivity S_{R610} at 610nm is preferably not less than 90% of the maximum value S_{Rmax} of the spectral sensitivity of the red-sensitive layer.

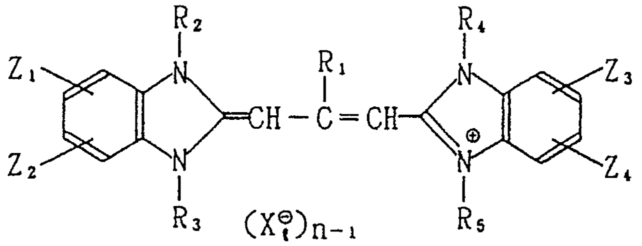
In order to efficiently obtain a desired spectral sensitivity, it is preferable that the sensitising dyes to be contained in the green-sensitive and red-sensitive layers be adsorbed together to silver halide at the time of the chemical sensitization thereof.

Forming the red-sensitive layer so as to satisfy the spectral sensitivity distribution of the invention can be carried out by using a properly selected spectral sensitising dye. For example, at least one of the sensitising dyes represented by the following Formula I and at least one of the sensitizing dyes represented by the following Formula III may be used in combination. And the respective at least ones selected from the sensitizing dyes of Formulas I, II and III may also be used in combination.

In addition to the sensitizing dyes represented by Formulas I, II and III, there may be used a supersensitizer, examples of which include benzoylthiazoles, quinolines, and the quinoline derivatives described in Japanese Patent Examined Publication No. 24899/1982.

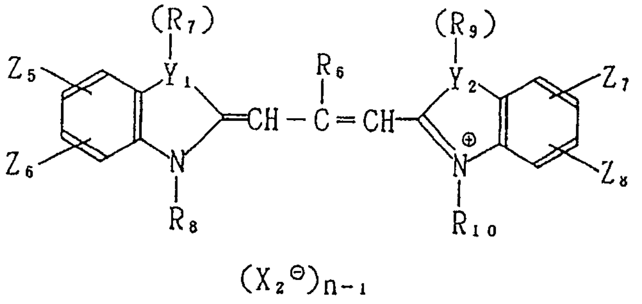
The sensitizing dyes represented by Formulas I, II and III are explained:

Formula I



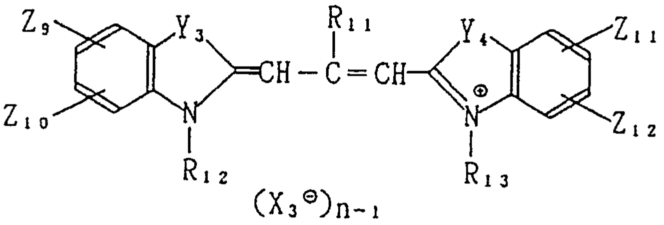
wherein R_1 is a hydrogen atom, an alkyl group or an aryl group; R_2, R_3, R_4 and R_5 each are an alkyl group or an aryl group; Z_1, Z_2, Z_3 and Z_4 each are a hydrogen atom, a halogen atom, a hydroxyl group, an alkoxy group, an amino group, an acyl group, an acylamino group, an acyloxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxycarbonylamino group, a carbamoyl group, an aryl group, an alkyl group, a cyano group or a sulfonyl group, provided that Z_1 and Z_2 and/or Z_3 and Z_4 may combine with each other to form a ring; $X_1^{\ominus}$ is an anion; and n is an integer of 1 or 2, provided that n is 1 when the sensitizing dye forms an intramolecular salt.

Formula II



wherein R_6 is a hydrogen atom, an alkyl group or an aryl group; R_7, R_8, R_9 and R_{10} each are an alkyl group or an aryl group; Y_1 and Y_2 each are a nitrogen atom, an oxygen group, a sulfur atom or a selenium atom, provided that when Y_1 is a sulfur, oxygen or selenium atom, it is free of the above R_7, and Y_1 and Y_2 can not be nitrogen or sulfur atoms at the same time; Z_5, Z_6, Z_7 and Z_8 each are a hydrogen atom, a halogen atom, a hydroxyl group, an alkoxy group, an amino group, an acyl group, an acylamino group, an acyloxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxycarbonylamino group, a carbamoyl group, an aryl group, an alkyl group, a cyano group or a sulfonyl group, provided that Z_5 and Z_6 and/or Z_7 and Z_8 each may combine with each other to form a ring; $X_2^{\ominus}$ is an anion; and n is an integer of 1 or 2, provided that when the sensitizing dye forms an intramolecular salt, n is an integer of 1.

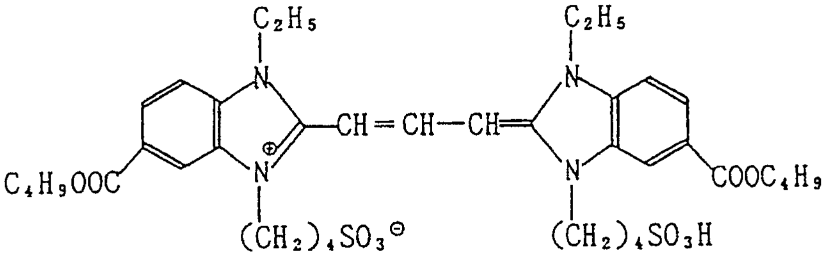
Formula III



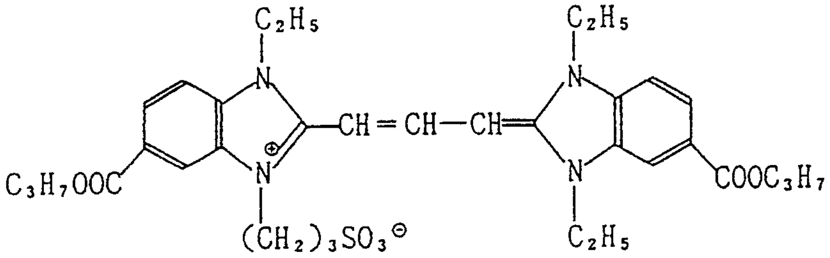
wherein R^{11} is a hydrogen atom, an alkyl group or an aryl group; R^{12} and R^{13} each are an alkyl group or an aryl group; Y^3 and Y^4 each are a sulfur atom or a selenium atom; Z^9, Z^{10}, Z^{11} and Z^{12} each are a hydrogen atom, a halogen atom, a hydroxyl group, an alkoxy group, an amino group, an acyl group, an acylamino group, an acyloxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxycarbonylamino group, a sulfonyl group, a carbamoyl group, an aryl group, an alkyl group or a cyano group; Z^9 and Z^{10} and/or Z^{11} and Z^{12} may combine with each other to form a ring; X_3^- is an anion; and n is an integer of 1 or 2, provided that the sensitizing dye form an intramolecular salt, n is an integer of 1.

The following are typical examples of the sensitizing dyes represented by Formulas I, II and III.

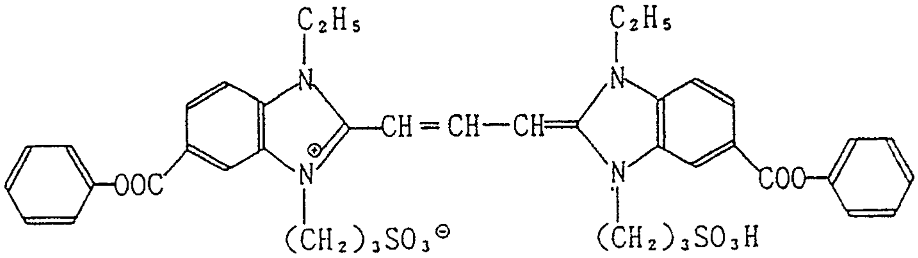
(I－1)


C₂H₅
N
N
C₄H₉OOC
(CH₂)₄SO₃⊖
CH＝CH—CH
C₂H₅
N
N
COOC₄H₉
(CH₂)₄SO₃H

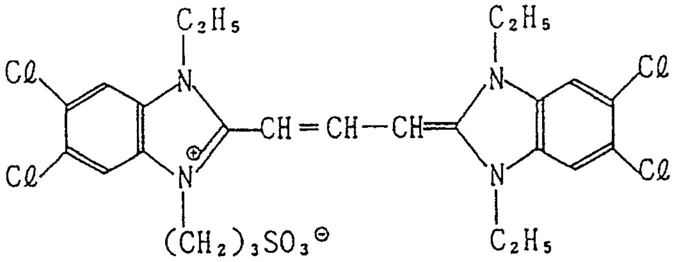
(I－2)


C₂H₅
N
N
C₃H₇OOC
(CH₂)₃SO₃⊖
CH＝CH—CH
C₂H₅
N
N
COOC₃H₇
C₂H₅

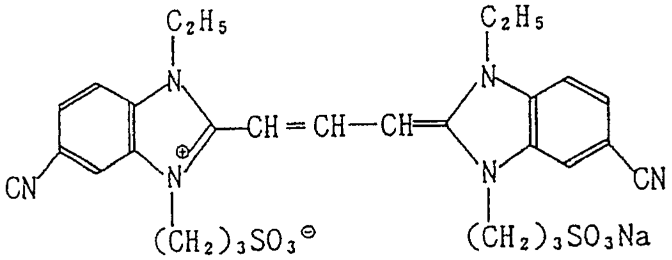
(I－3)


C₂H₅
N
N
OOC
(CH₂)₃SO₃⊖
CH＝CH—CH
C₂H₅
N
N
COO
(CH₂)₃SO₃H

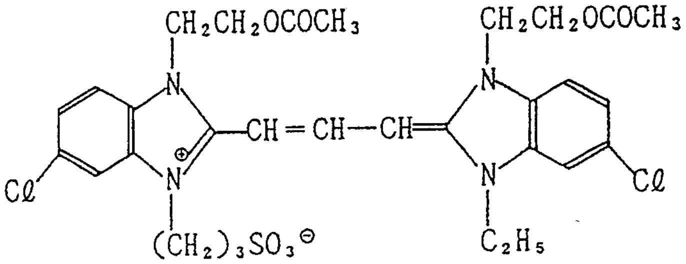
(I－4)


C₂H₅
Cl
Cl
N
N
(CH₂)₃SO₃⊖
CH＝CH—CH
C₂H₅
N
N
Cl
Cl
C₂H₅

（I－5）



（I－6）



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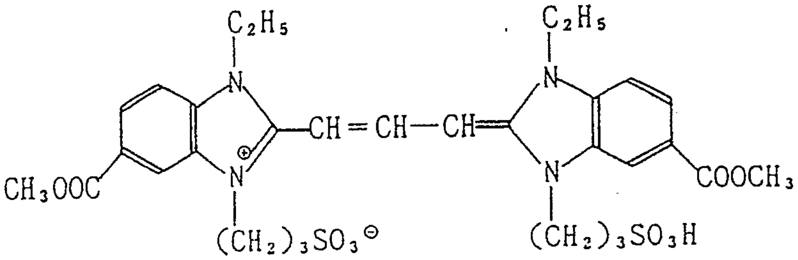
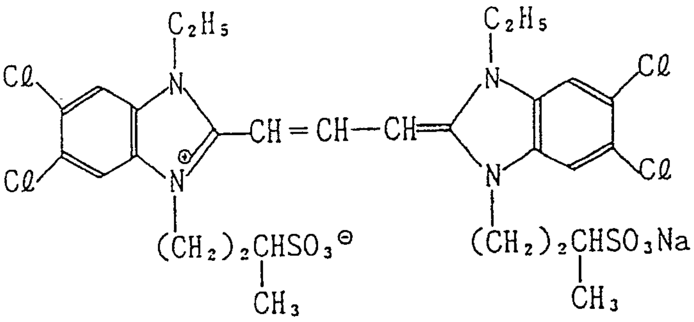


（I－8）



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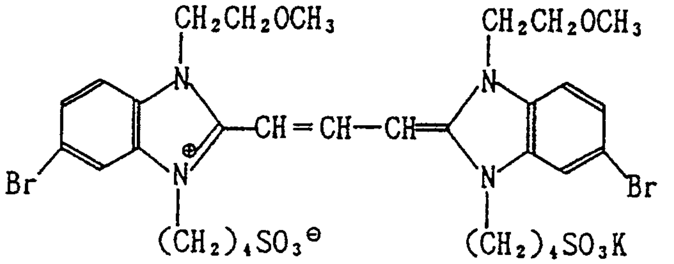

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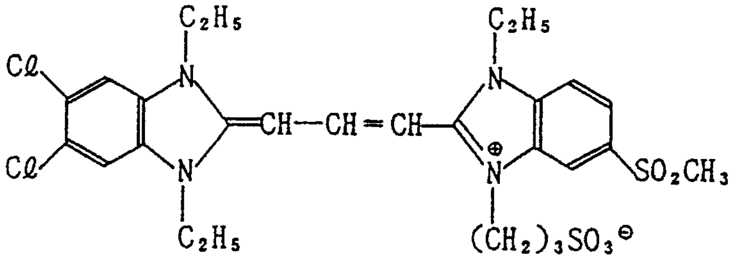

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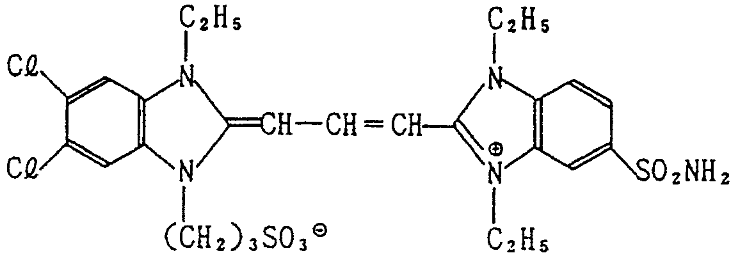

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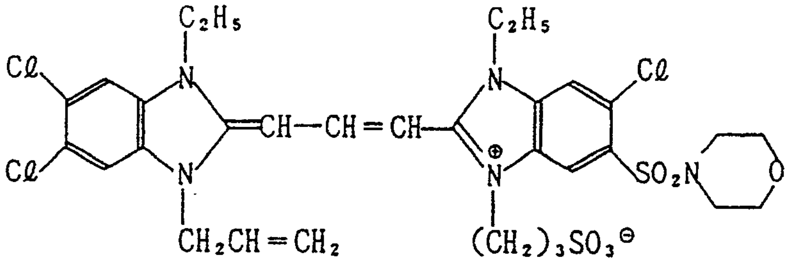

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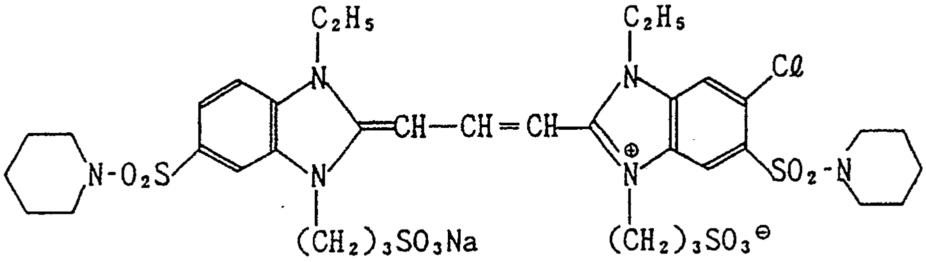

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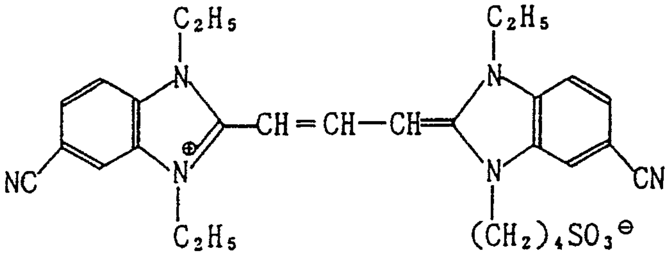

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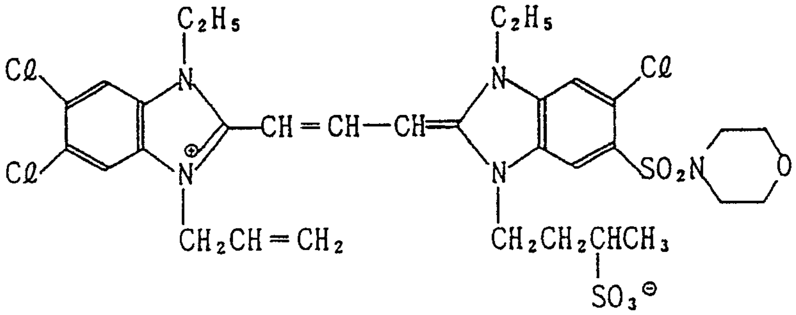

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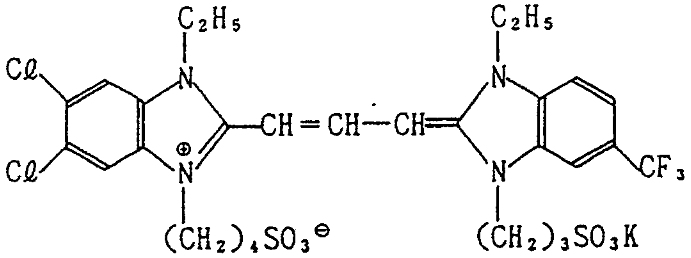

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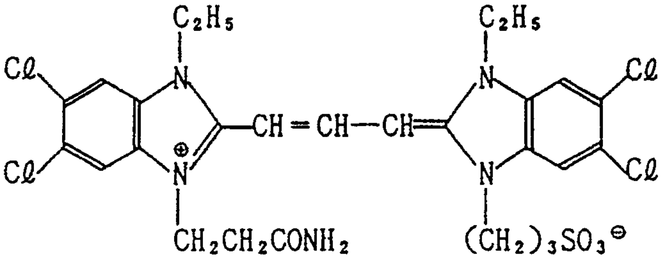

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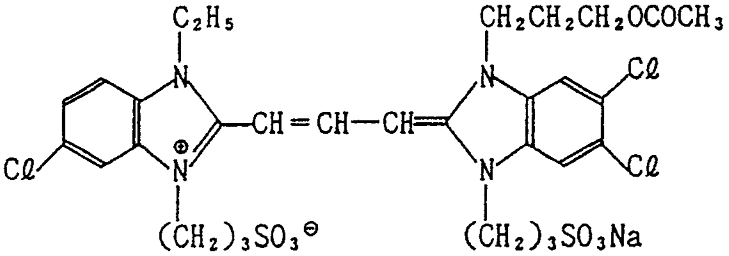

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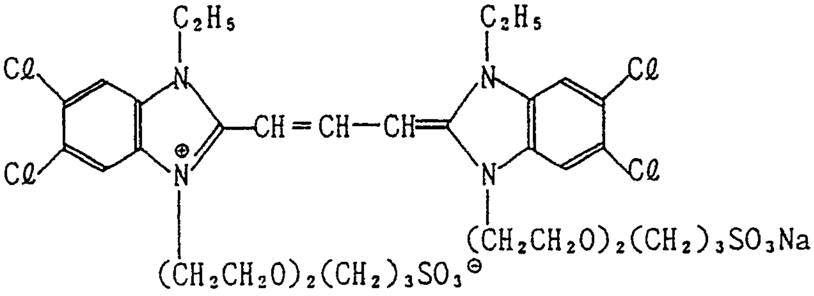

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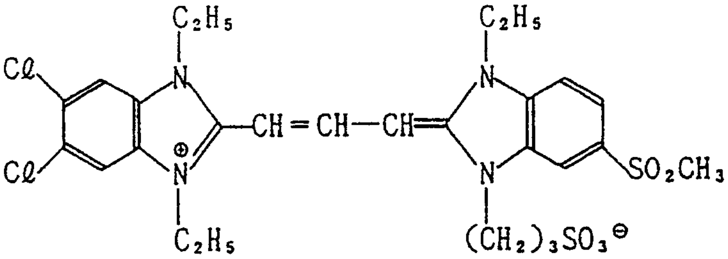

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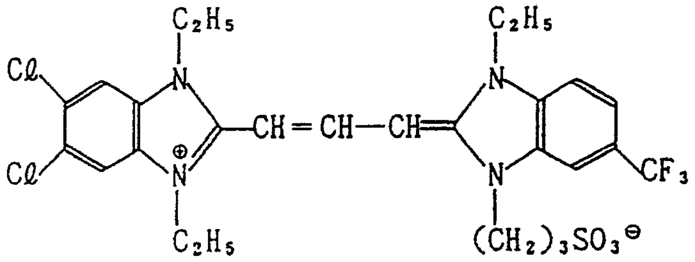

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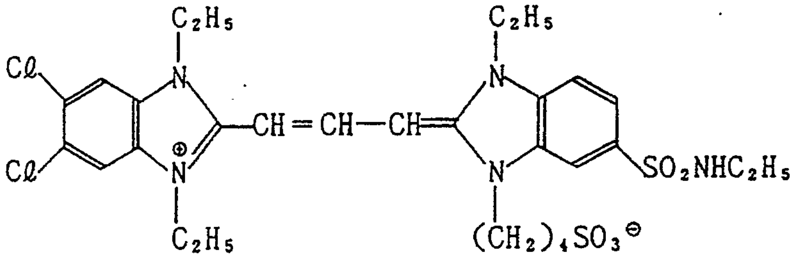

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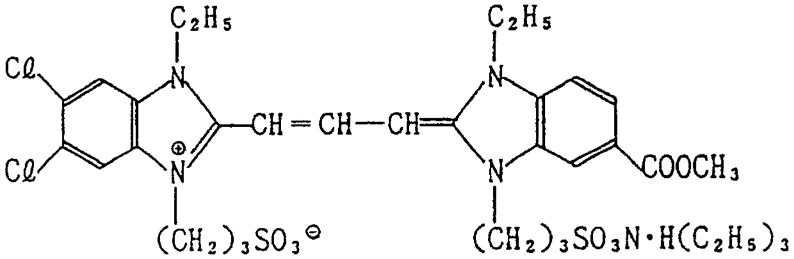

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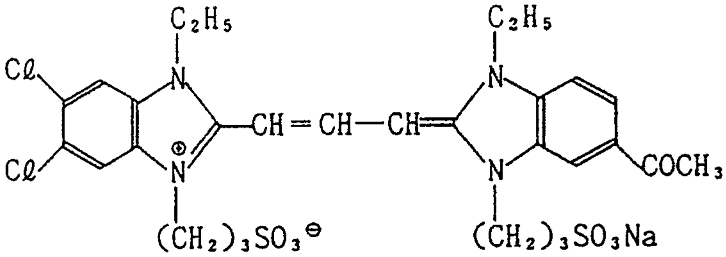

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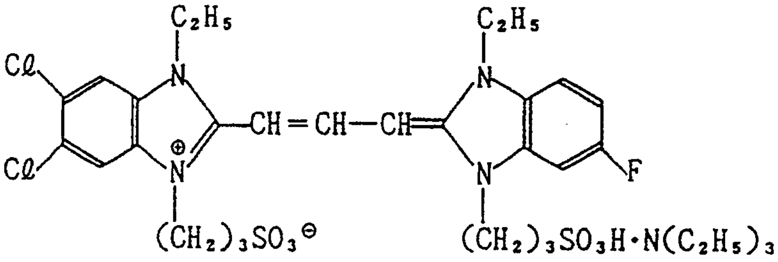

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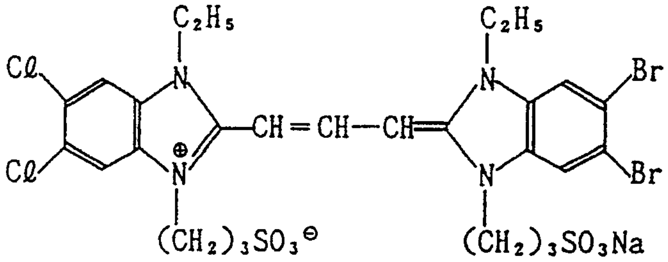

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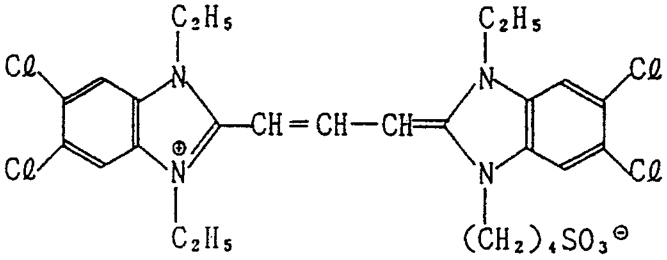

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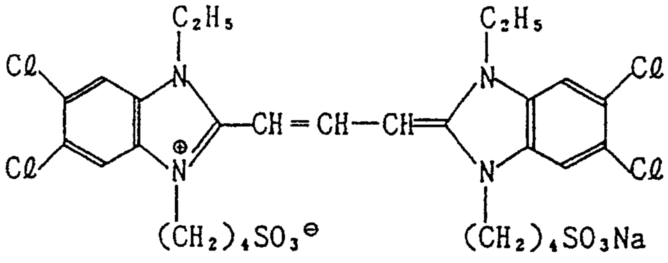

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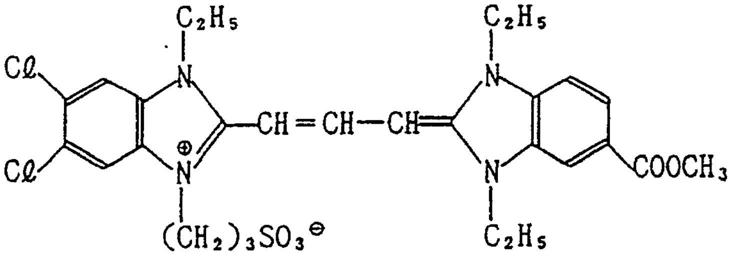

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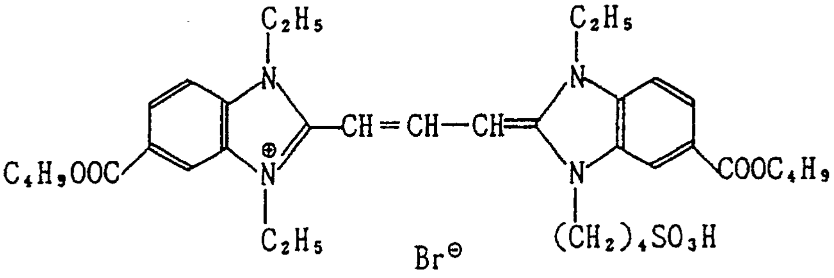

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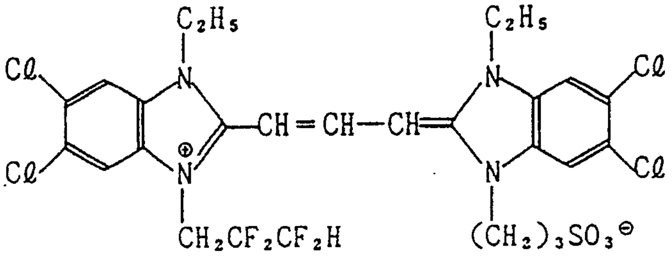
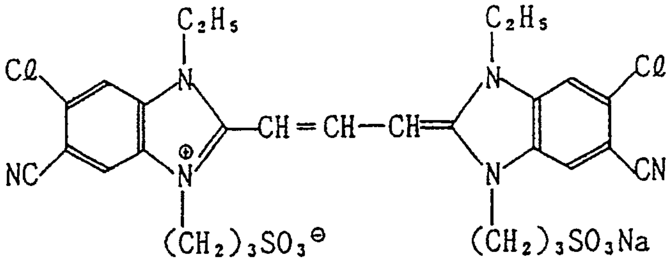
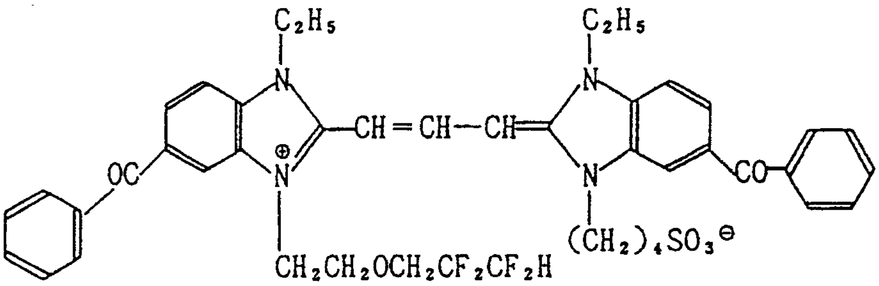


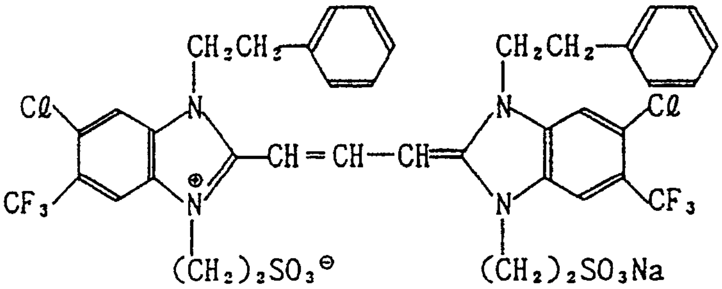
(I −32)



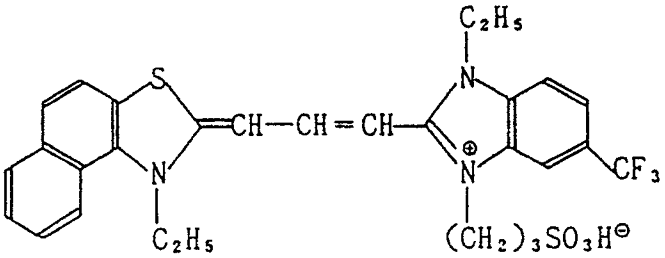
(I −33)



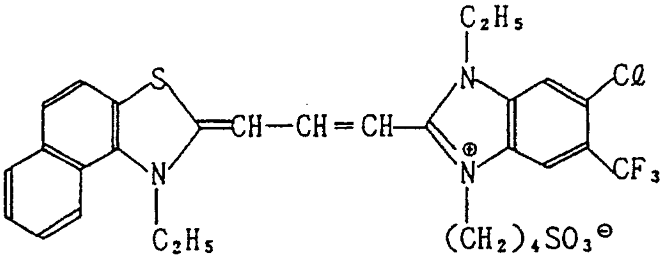
(I −34)



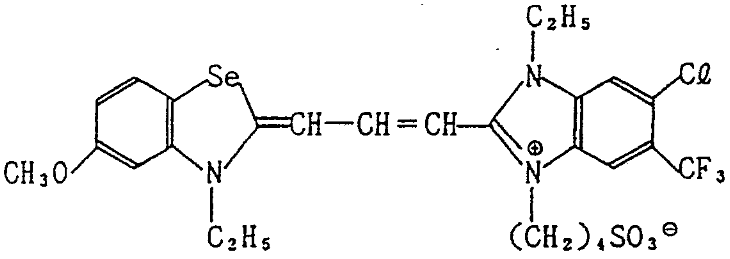
(II − 1)



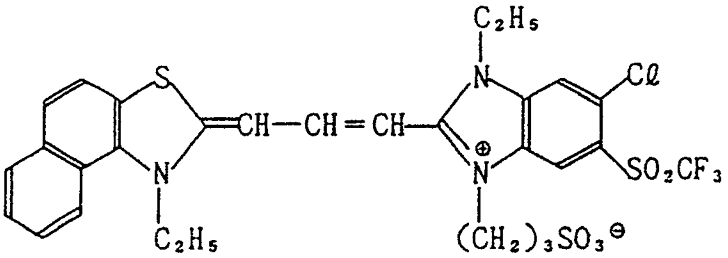
(II − 2)



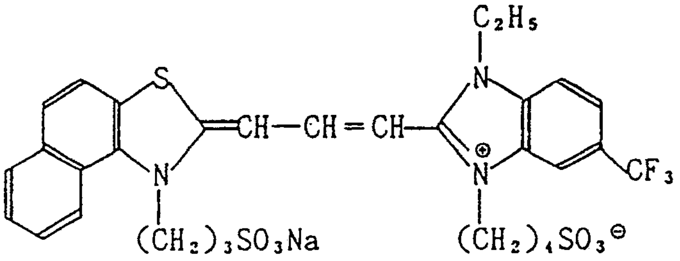
（Ⅱ－3）


Se
CH=CH—CH=CH
CH₃O
N
C₂H₅
C₂H₅
N
⊕N
Cℓ
CF₃
(CH₂)₄SO₃⊖

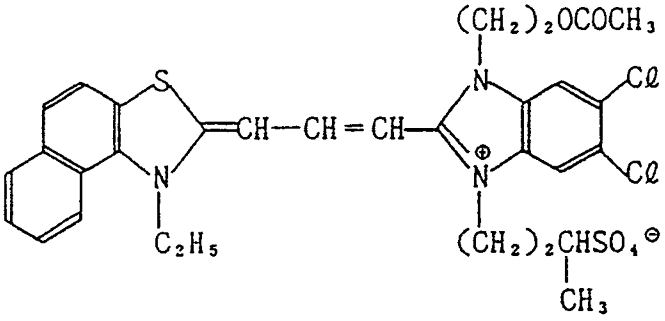
（Ⅱ－4）


S
CH—CH=CH
N
C₂H₅
C₂H₅
N
⊕N
Cℓ
SO₂CF₃
(CH₂)₃SO₃⊖

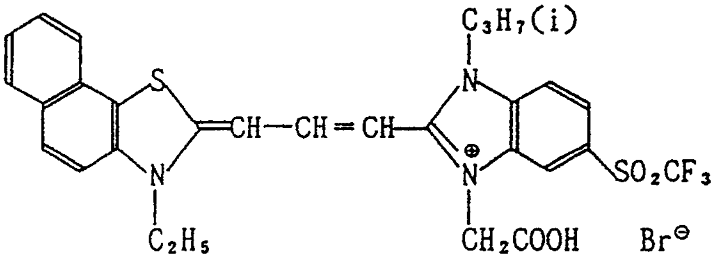
（Ⅱ－5）


S
CH—CH=CH
N
(CH₂)₃SO₃Na
C₂H₅
N
⊕N
CF₃
(CH₂)₄SO₃⊖

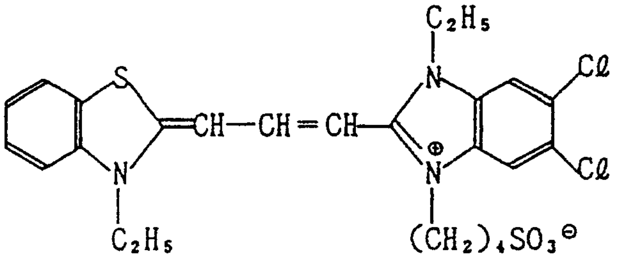
（Ⅱ－6）


S
CH—CH=CH
N
C₂H₅
(CH₂)₂OCOCH₃
N
⊕N
Cℓ
Cℓ
(CH₂)₂CHSO₄⊖
CH₃

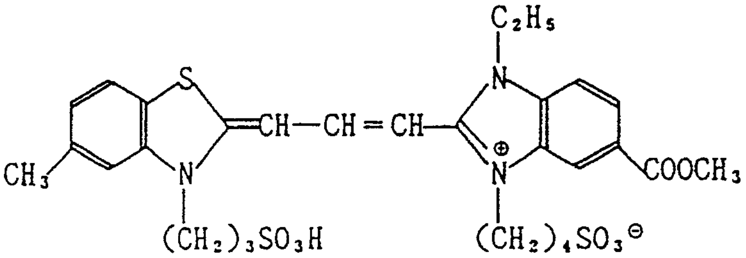
(Ⅱ－7)


$C_3H_7(i)$
S
N
CH—CH=CH
⊕N
SO_2CF_3
C_2H_5
CH_2COOH
Br⊖

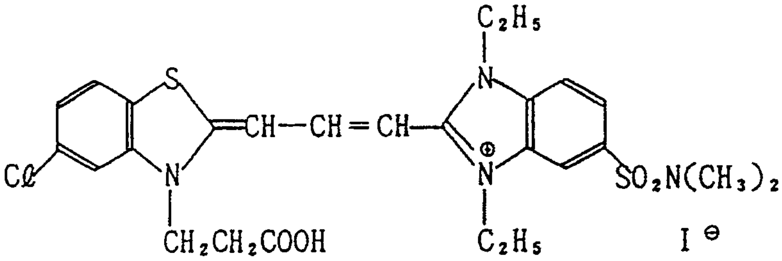
(Ⅱ－8)


C_2H_5
Cl
S
N
CH—CH=CH
⊕N
Cl
C_2H_5
$(CH_2)_4SO_3^{\ominus}$

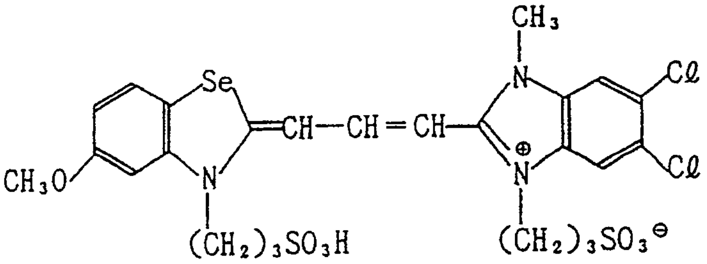
(Ⅱ－9)


C_2H_5
S
N
CH—CH=CH
⊕N
CH_3
$COOCH_3$
$(CH_2)_3SO_3H$
$(CH_2)_4SO_3^{\ominus}$

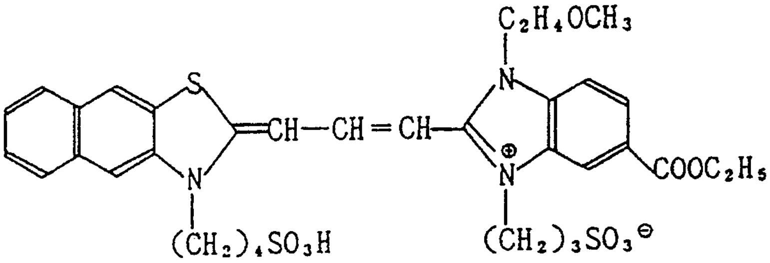
(Ⅱ－10)


C_2H_5
S
N
CH—CH=CH
⊕N
Cl
$SO_2N(CH_3)_2$
CH_2CH_2COOH
C_2H_5
I⊖

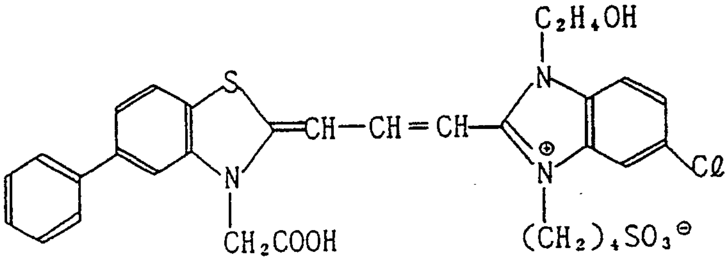
(Ⅱ—11)



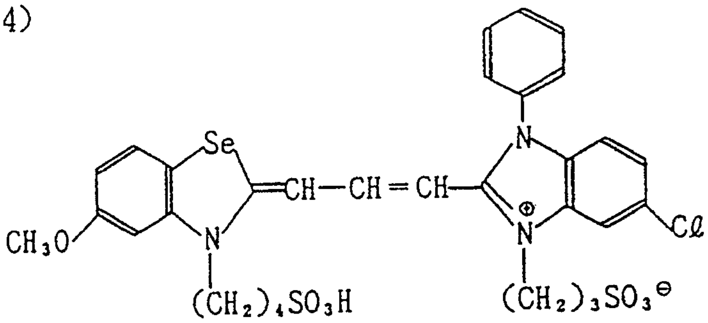
(Ⅱ—12)



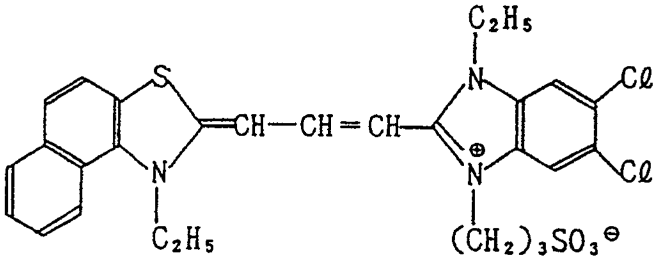
(Ⅱ—13)



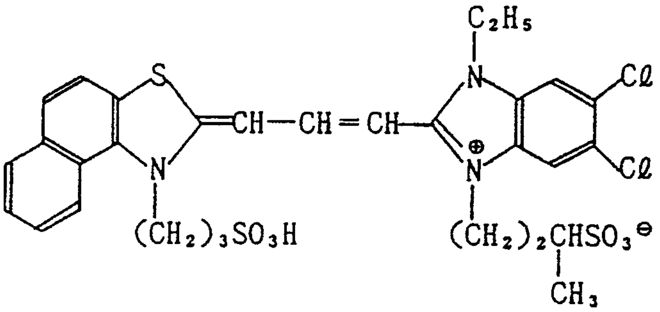
(Ⅱ—14)



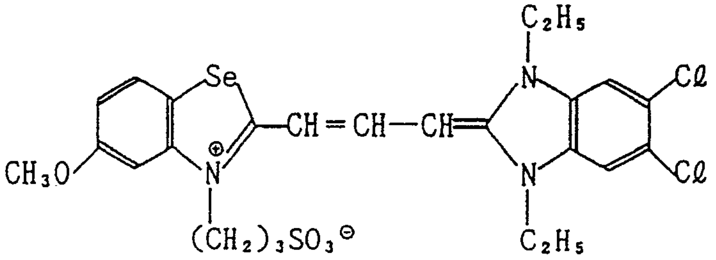
(II—15)



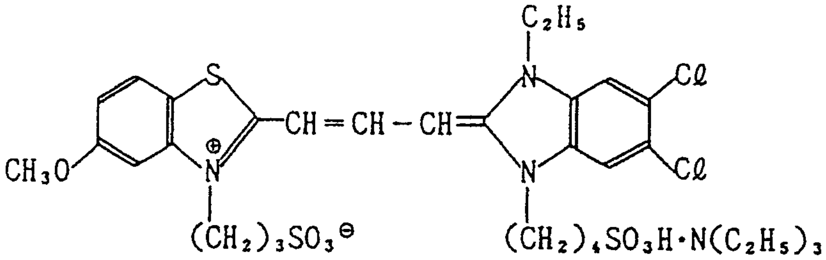
(II—16)



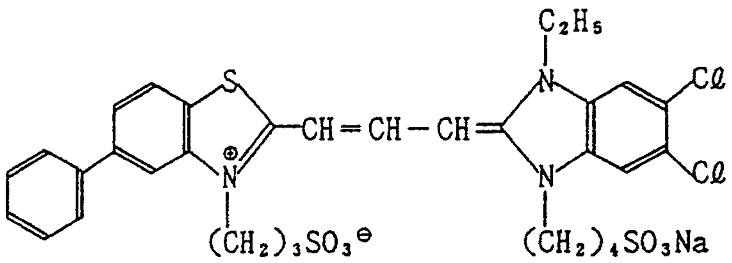
(II—17)



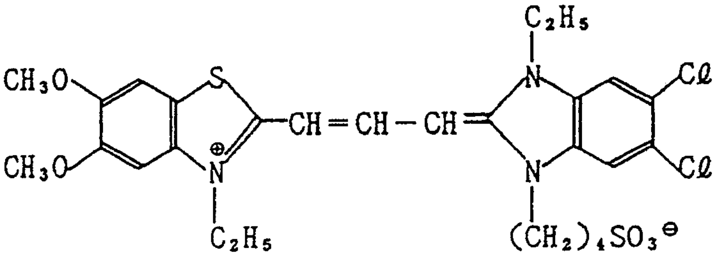
(II—18)



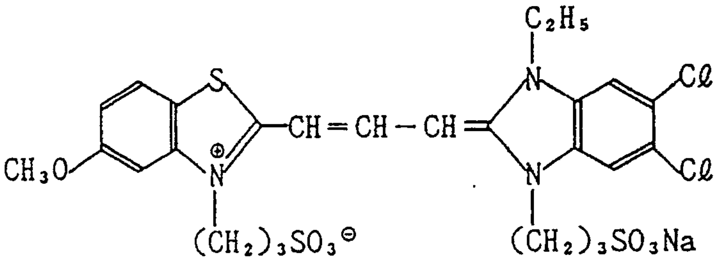
(II —19)



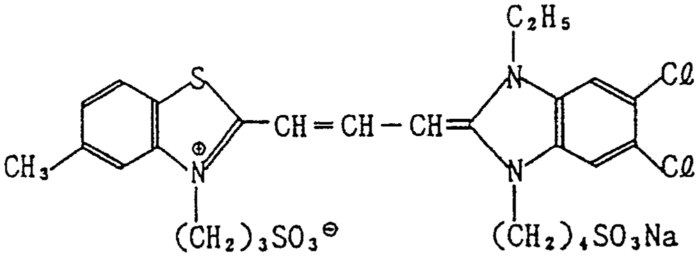
(II —20)



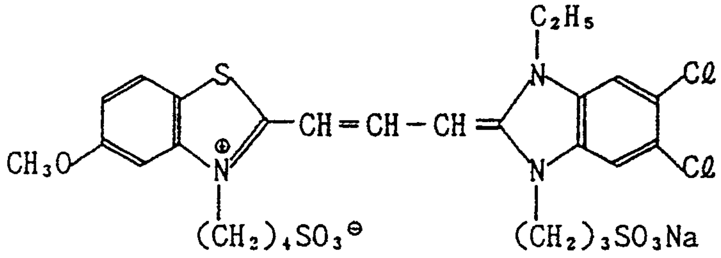
(II —21)



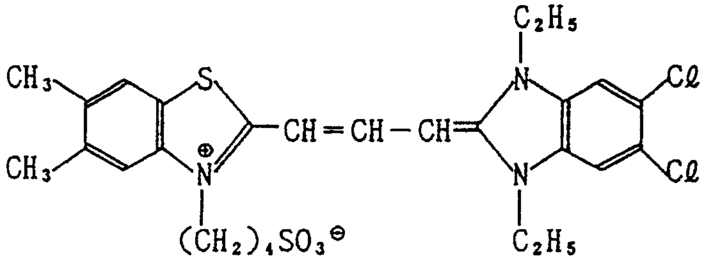
(II —22)



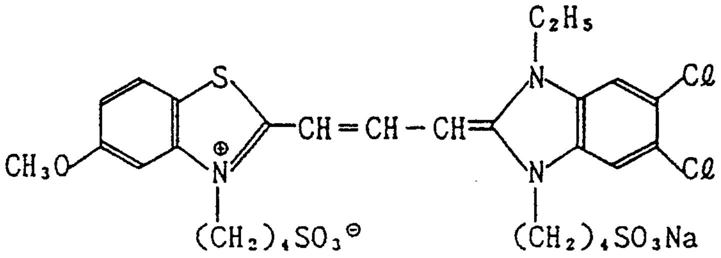
(Ⅱ−23)



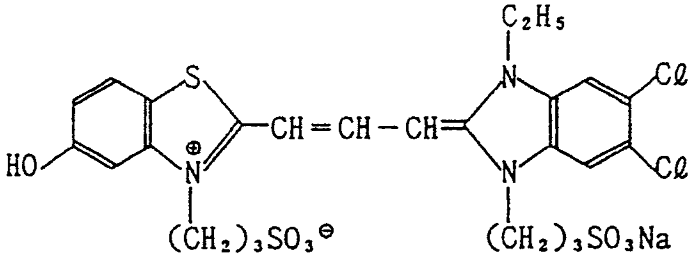
(Ⅱ−24)



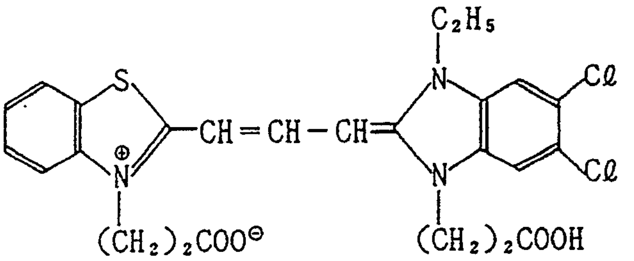
(Ⅱ−25)



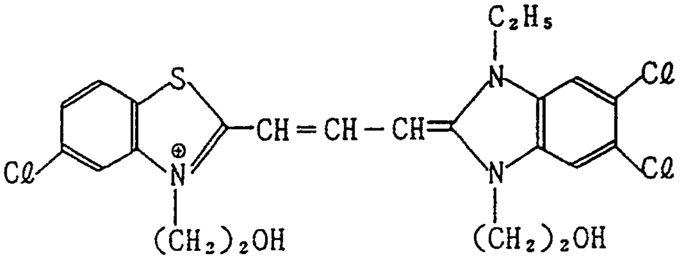
(Ⅱ−26)



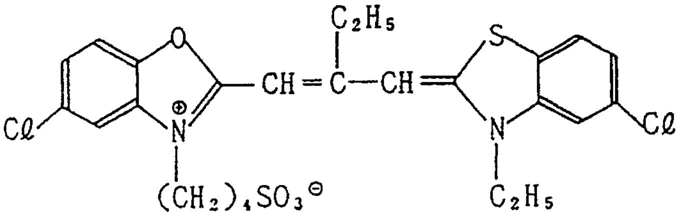
(Ⅱ−27)



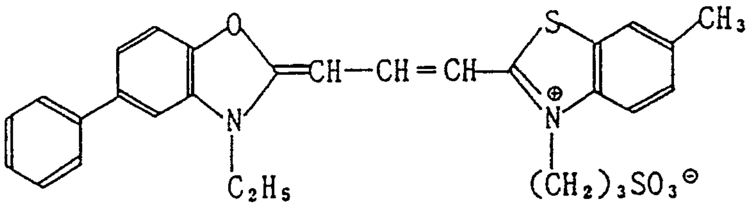
(Ⅱ−28)



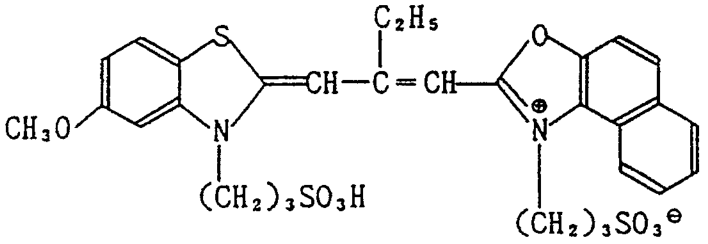
(Ⅱ−29)



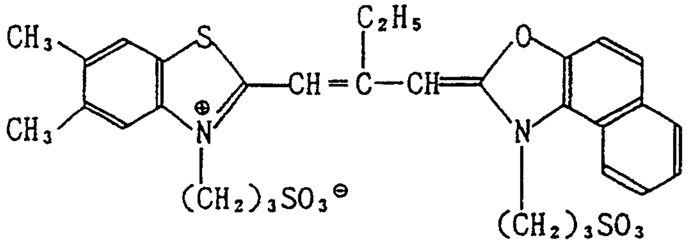
(Ⅱ−30)



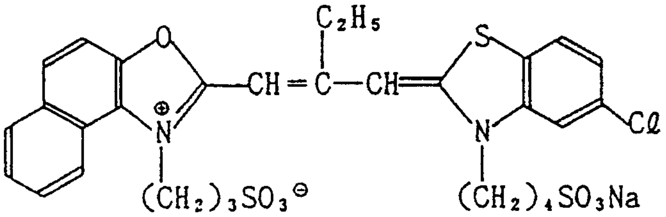
(Ⅱ—31)



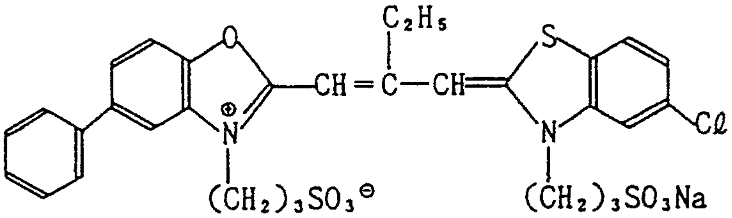
(Ⅱ—32)



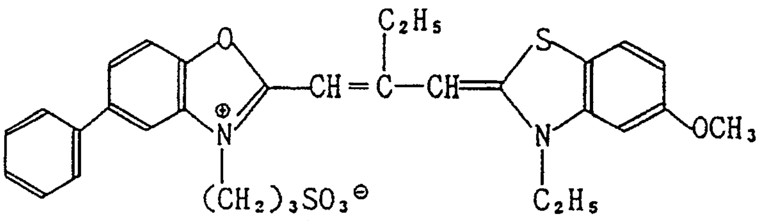
(Ⅱ—33)



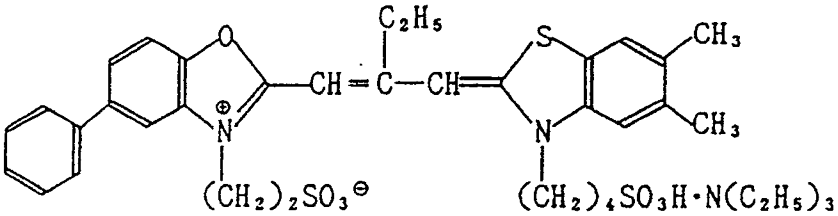
(Ⅱ—34)



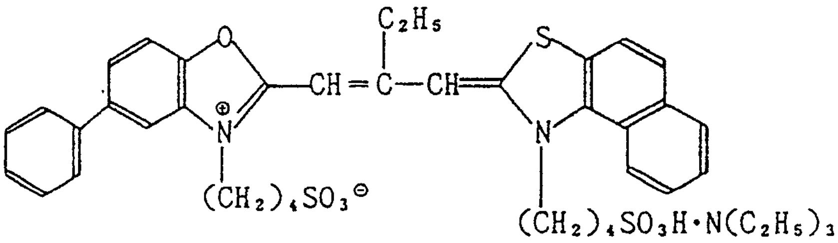
(Ⅱ—35)



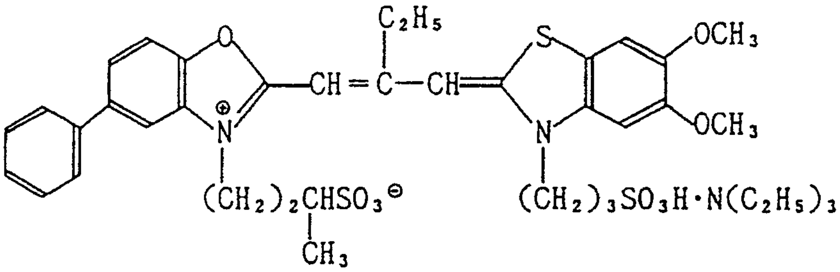
(Ⅱ—36)



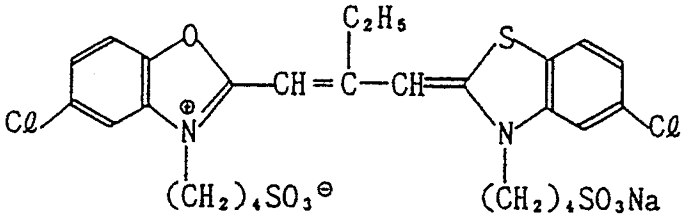
(Ⅱ—37)



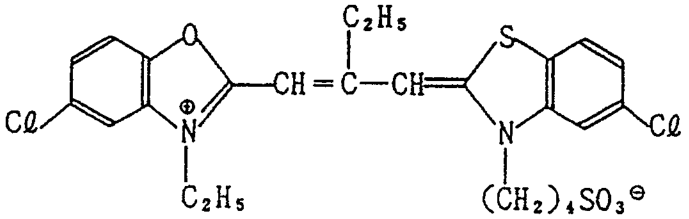
(Ⅱ—38)



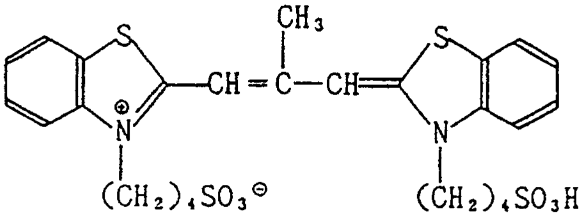
(Ⅱ－39)


C$_2$H$_5$
O
S
Cl
CH＝C—CH
N$^{\oplus}$
N
Cl
(CH$_2$)$_4$SO$_3^{\ominus}$
(CH$_2$)$_4$SO$_3$Na

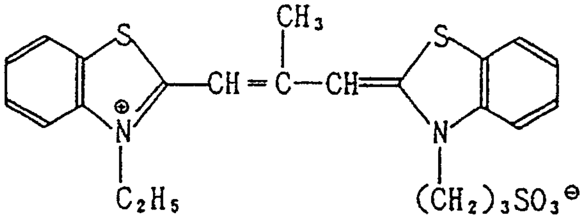
(Ⅱ－40)


C$_2$H$_5$
O
S
Cl
CH＝C—CH
N$^{\oplus}$
N
Cl
C$_2$H$_5$
(CH$_2$)$_4$SO$_3^{\ominus}$

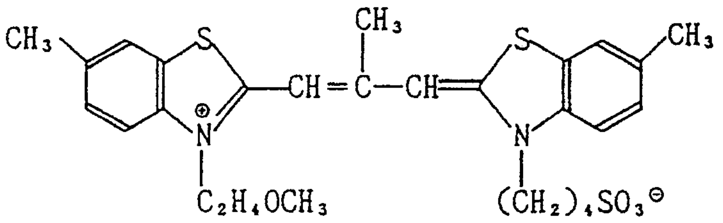
(Ⅲ－1)


CH$_3$
S
S
CH＝C—CH
N$^{\oplus}$
N
(CH$_2$)$_4$SO$_3^{\ominus}$
(CH$_2$)$_4$SO$_3$H

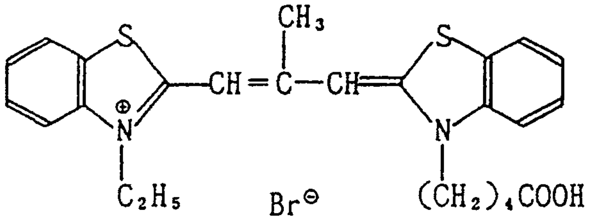
(Ⅲ－2)


CH$_3$
S
S
CH＝C—CH
N$^{\oplus}$
N
C$_2$H$_5$
(CH$_2$)$_3$SO$_3^{\ominus}$

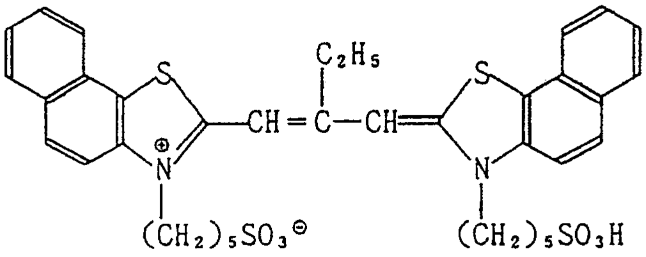
（Ⅲ－3）


CH₃
S
CH₃
S
CH₃
CH = C — CH
N⊕
N
C₂H₄OCH₃
(CH₂)₄SO₃⊖

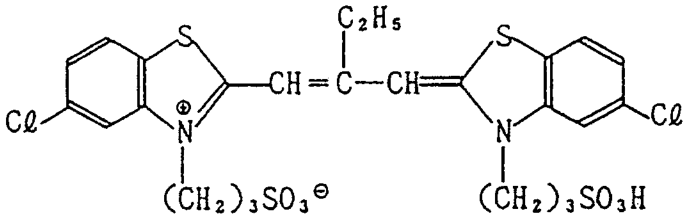
（Ⅲ－4）


S
CH₃
S
CH = C — CH
N⊕
N
C₂H₅
Br⊖
(CH₂)₄COOH

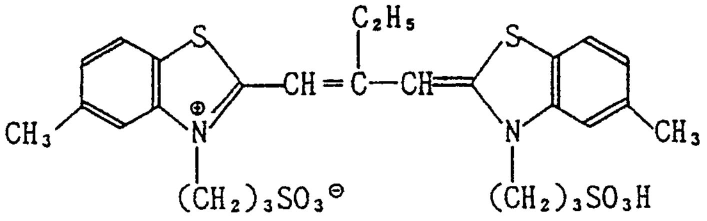
（Ⅲ－5）


S
C₂H₅
S
CH = C — CH
N⊕
N
(CH₂)₅SO₃⊖
(CH₂)₅SO₃H

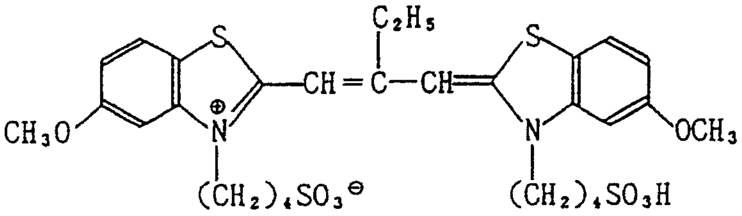
（Ⅲ－6）


S
C₂H₅
S
CH = C — CH
Cl
N⊕
N
Cl
(CH₂)₃SO₃⊖
(CH₂)₃SO₃H

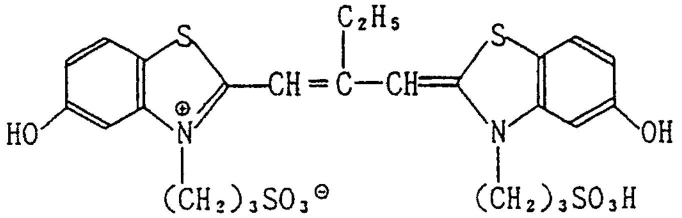
(Ⅲ－7)


C₂H₅
S
S
CH=C—CH=
CH₃
CH₃
⊕N
N
(CH₂)₃SO₃⊖
(CH₂)₃SO₃H

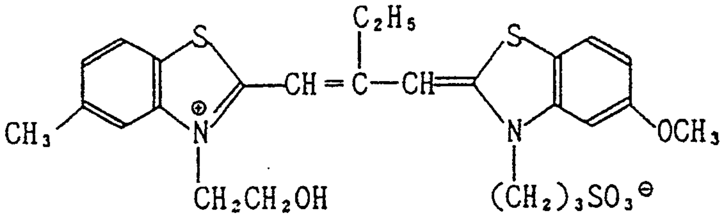
(Ⅲ－8)


C₂H₅
S
S
CH=C—CH=
CH₃O
OCH₃
⊕N
N
(CH₂)₄SO₃⊖
(CH₂)₄SO₃H

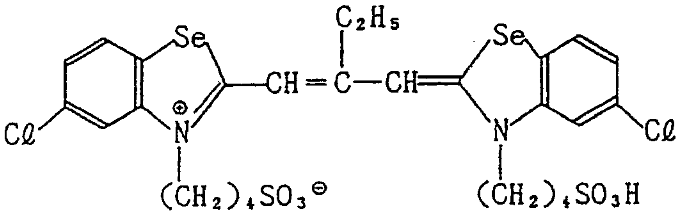
(Ⅲ－9)


C₂H₅
S
S
CH=C—CH=
HO
OH
⊕N
N
(CH₂)₃SO₃⊖
(CH₂)₃SO₃H

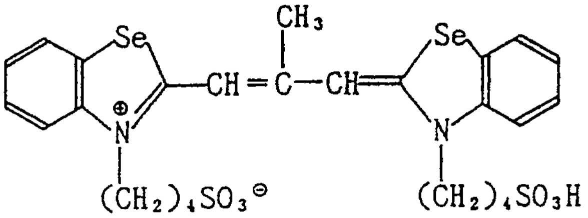
(Ⅲ－10)


C₂H₅
S
S
CH=C—CH=
CH₃
OCH₃
⊕N
N
CH₂CH₂OH
(CH₂)₃SO₃⊖

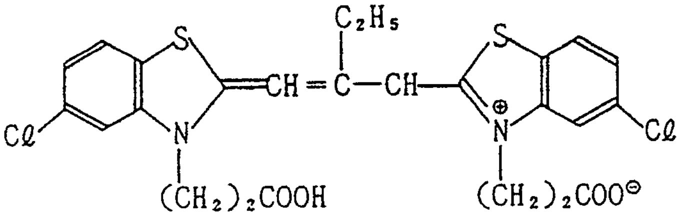
(Ⅲ—11)



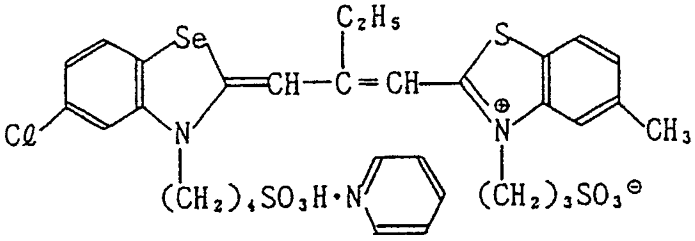
(Ⅲ—12)



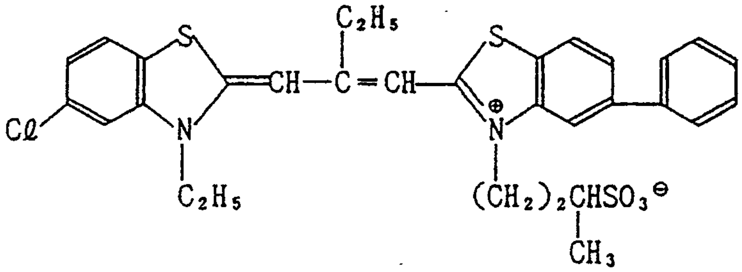
(Ⅲ—13)



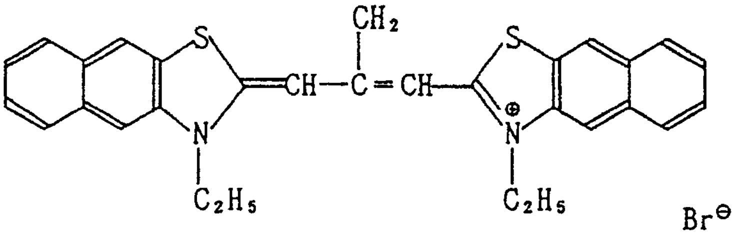
(Ⅲ—14)



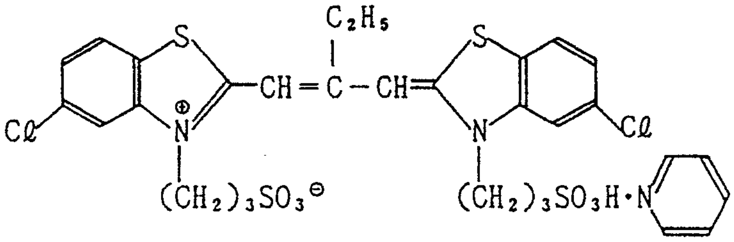
(Ⅲ—15)



(Ⅲ—16)



(Ⅲ—17)



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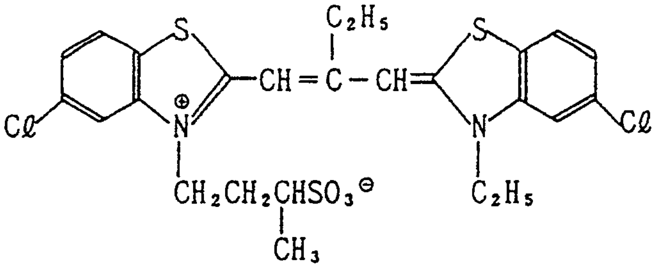

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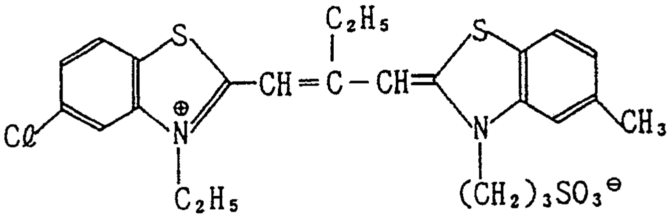

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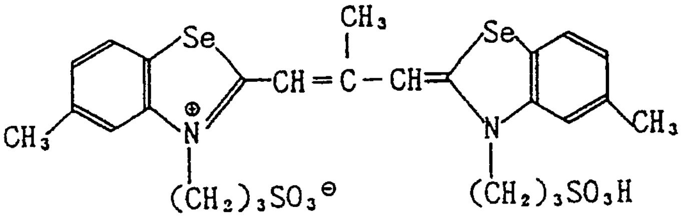

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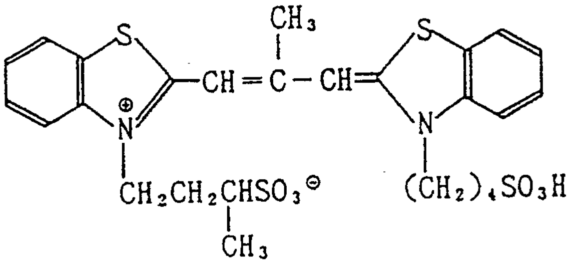

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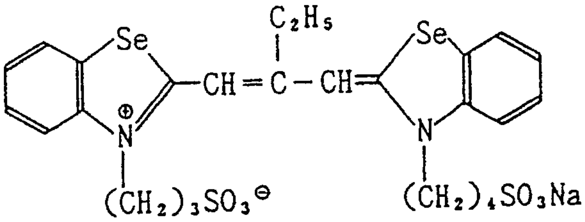

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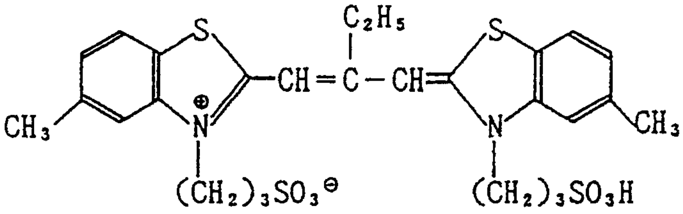

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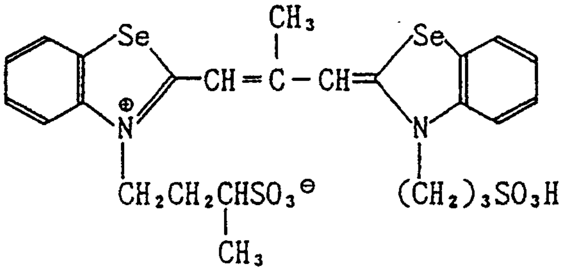

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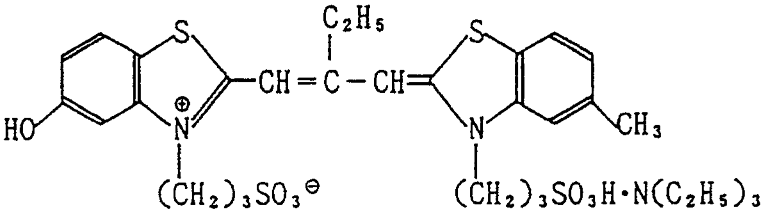

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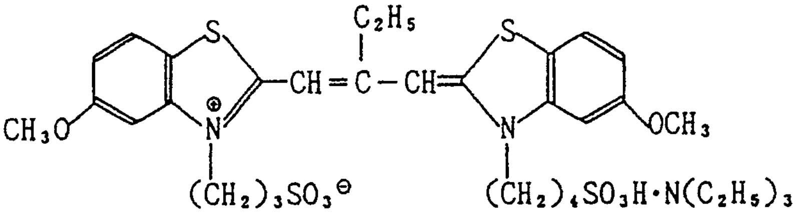

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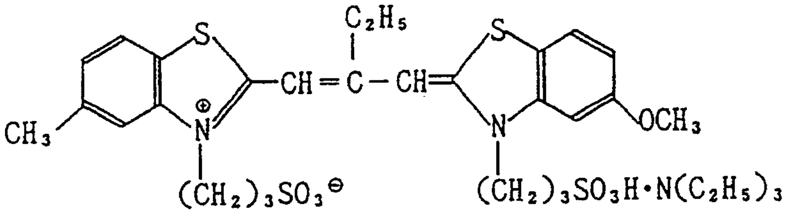

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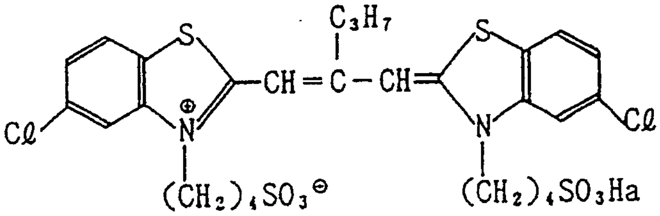

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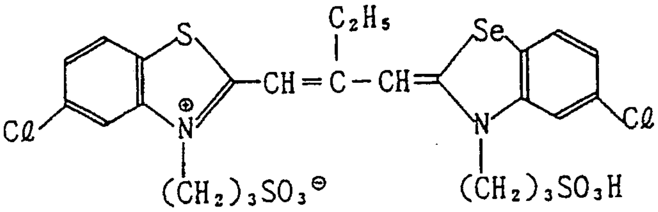

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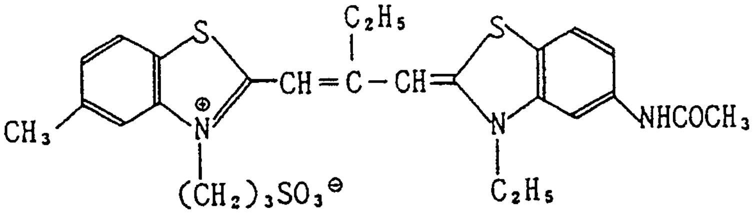

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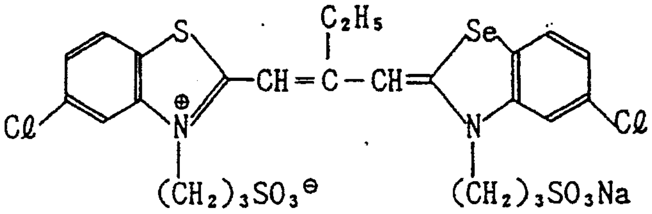

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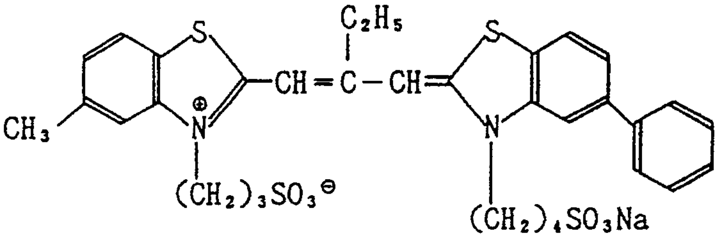

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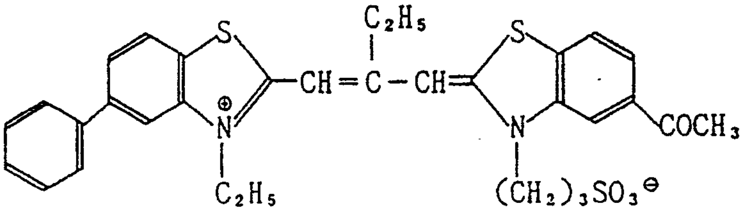

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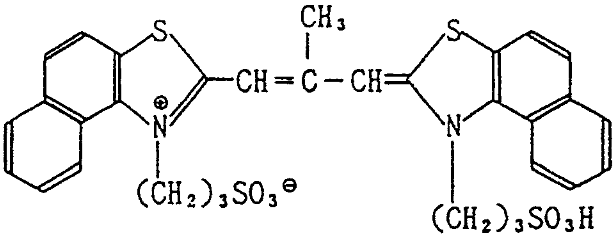

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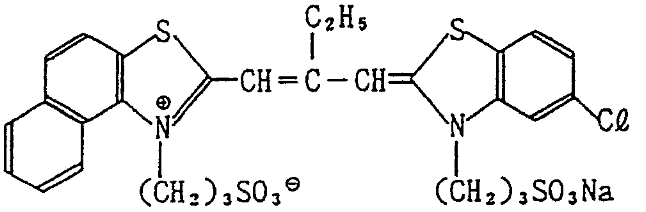

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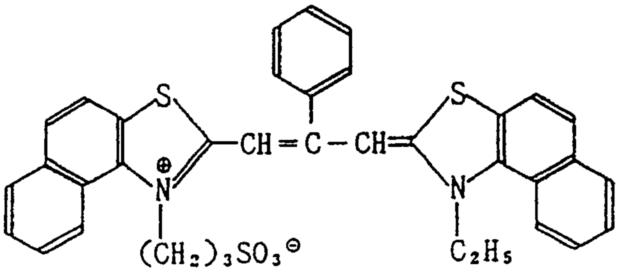

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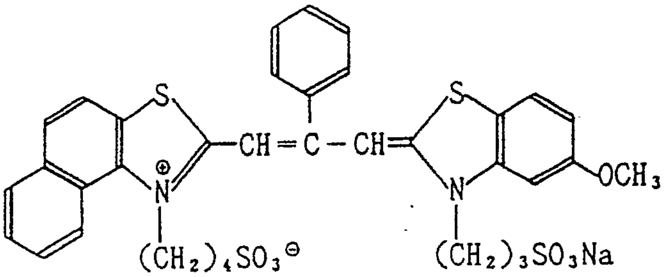

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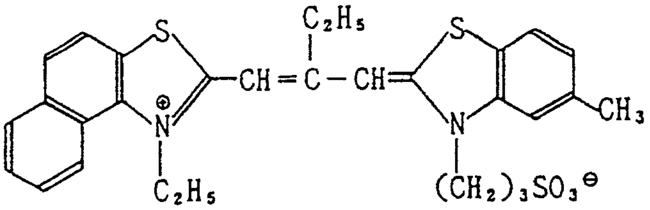

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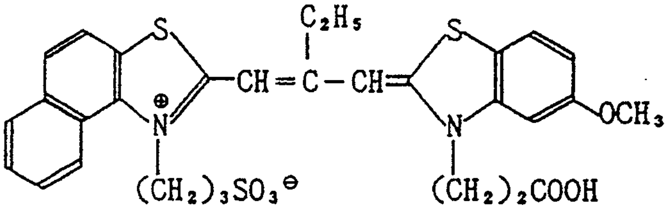

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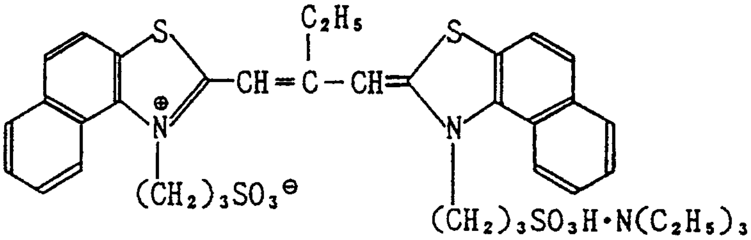

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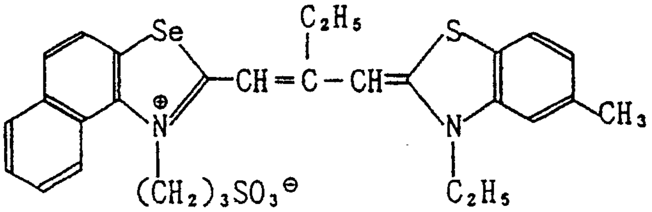

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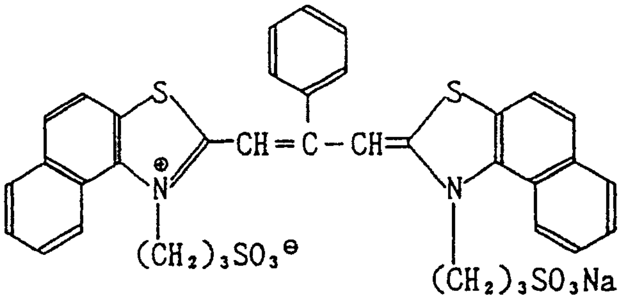

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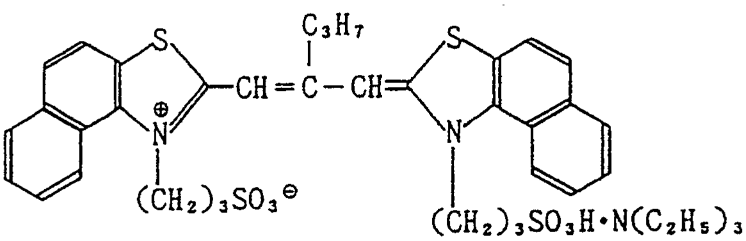

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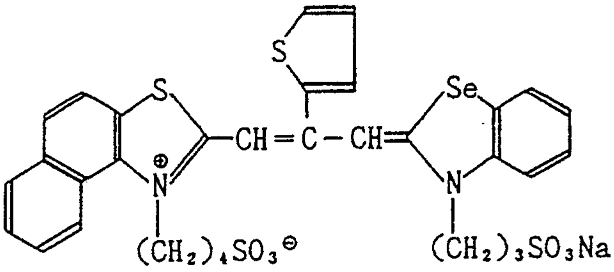

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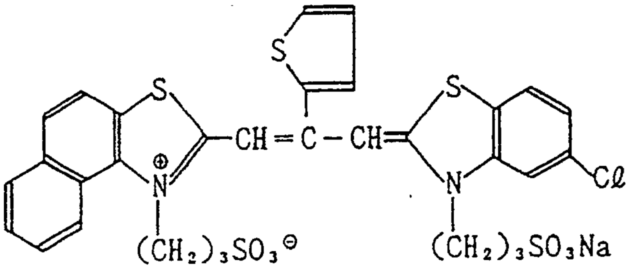

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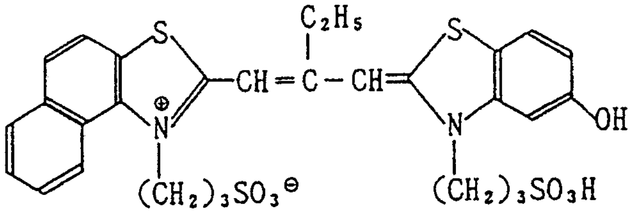
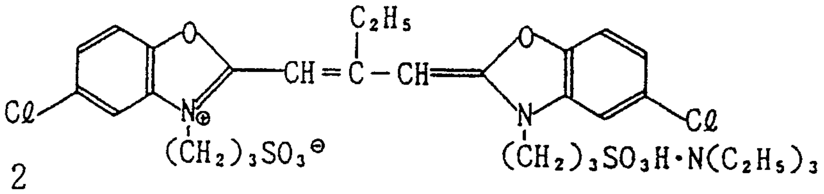


In the invention, forming the green-sensitive layer so as to satisfy the foregoing spectral sensitivity distribution of the invention may be achieved by using a properly selected spectral sensitizing dye.

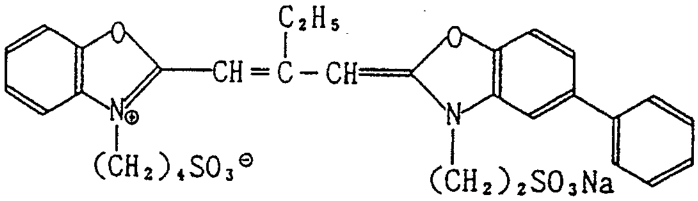
Representative sensitising dyes and super sensitizers applicable to the green-sensitive layer of the invention are given below, but are not limited thereto.

The foregoing sensitizing dyes of Formulas I and II usable for controlling the spectral sensitivity distribution of the aforementioned red-sensitive layer are also applicable.

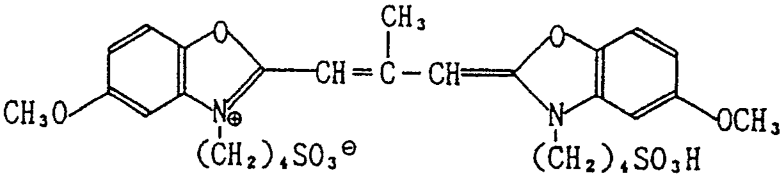
IV - 1



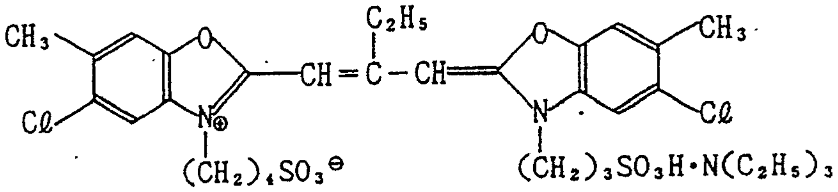
IV - 2



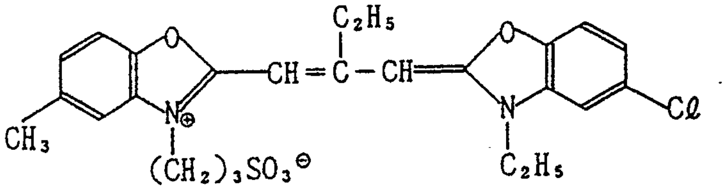
IV - 3



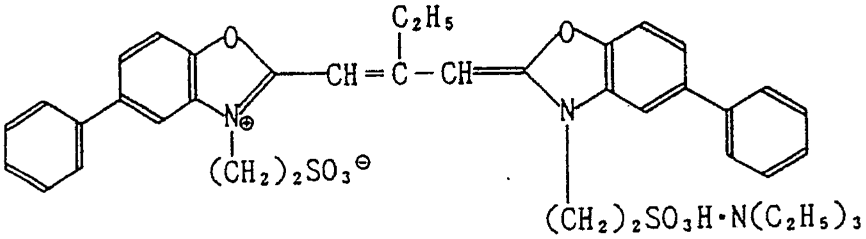
IV − 4



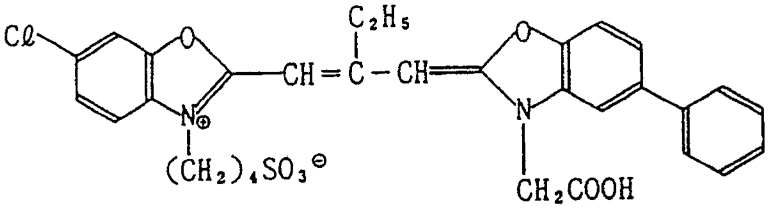
IV − 5



IV − 6



IV − 7



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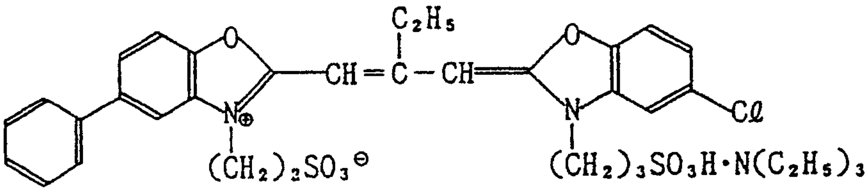

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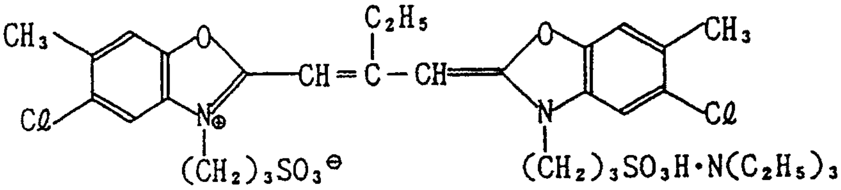
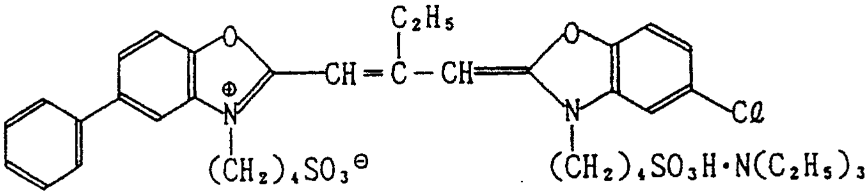


IV - 10



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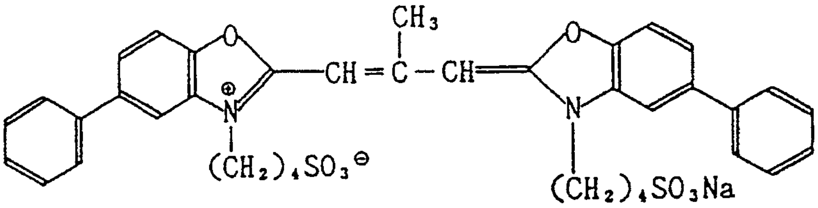

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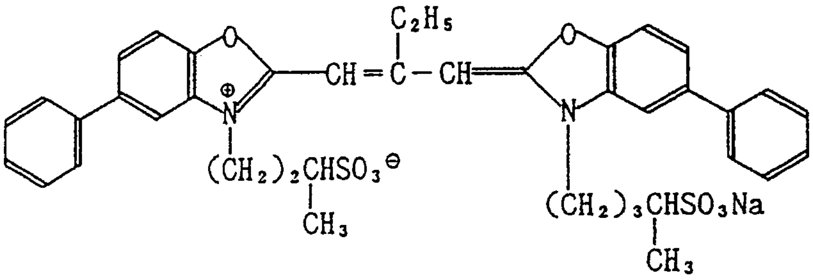

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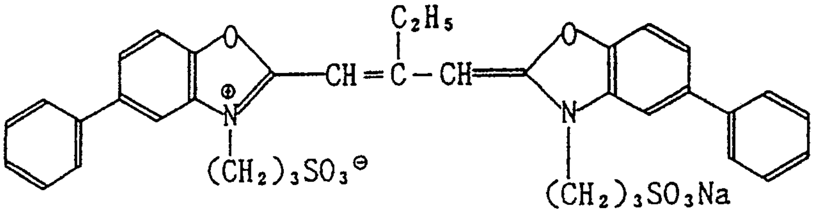

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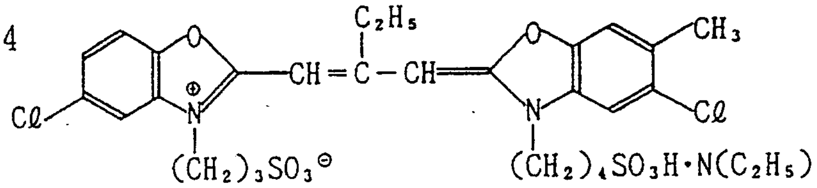

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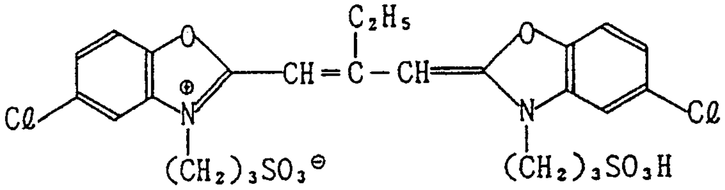

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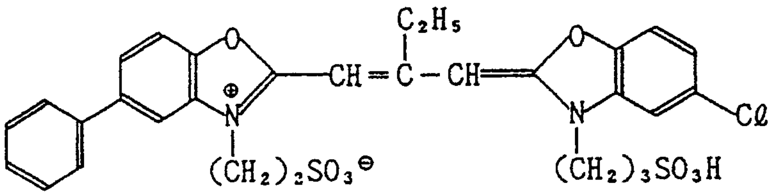

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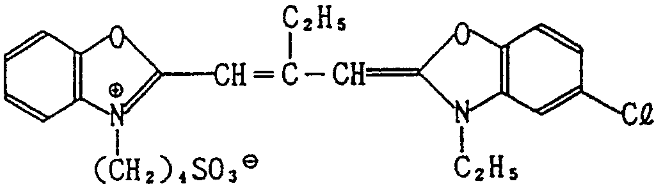

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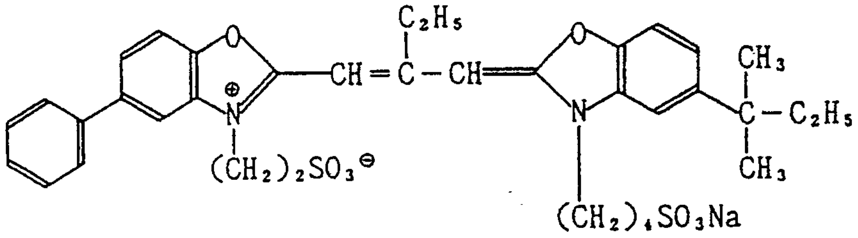

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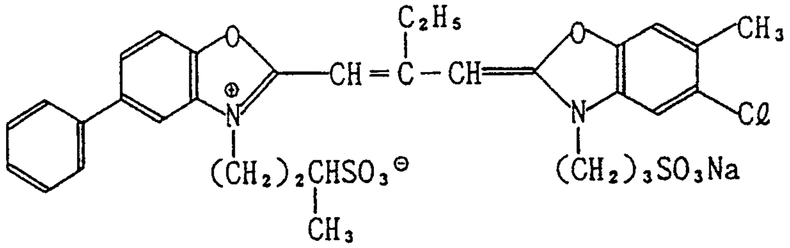
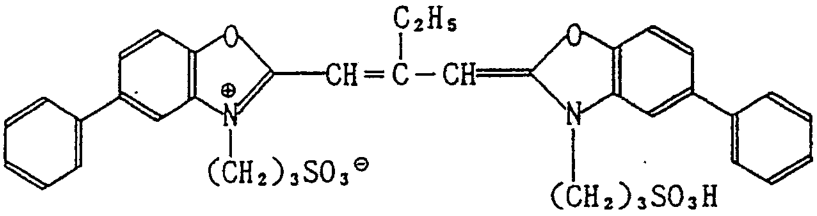
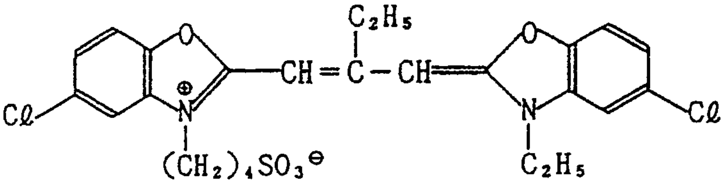


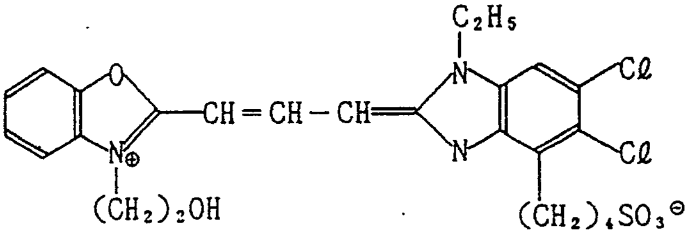
IV − 20



IV − 21



IV − 22



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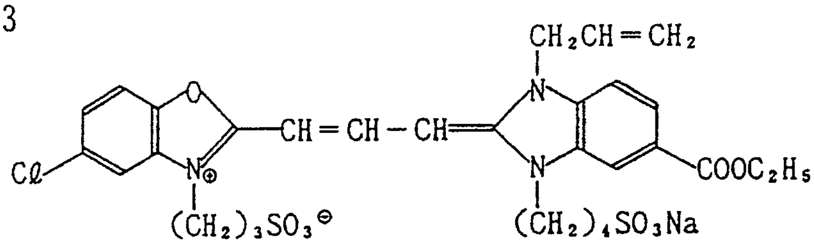

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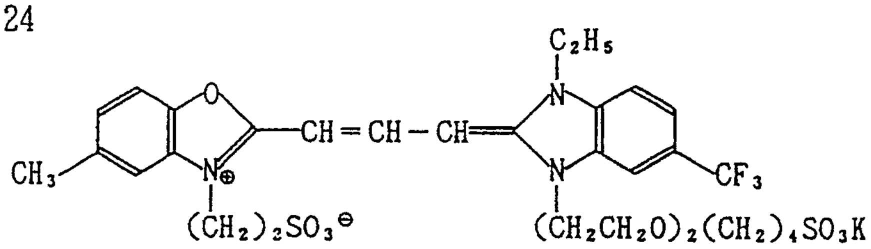

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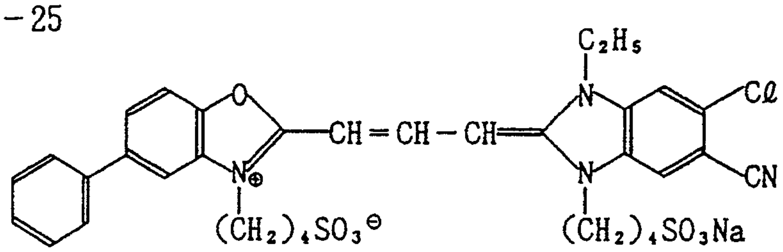

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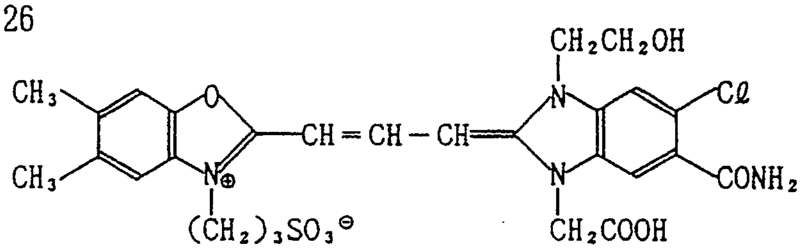

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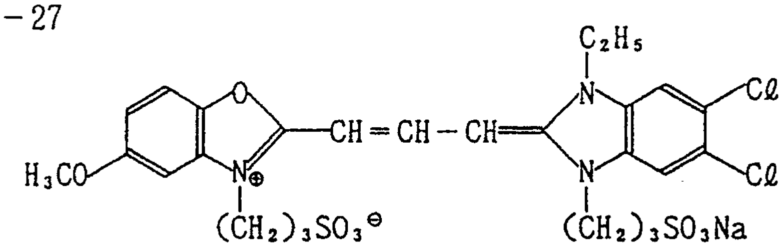

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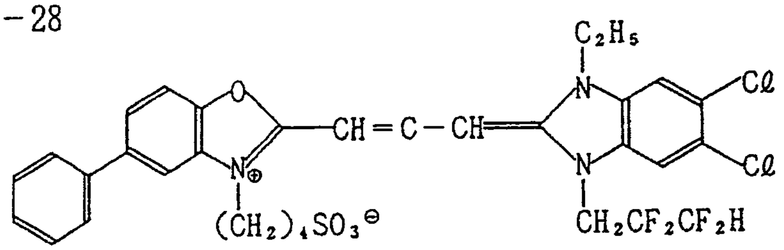

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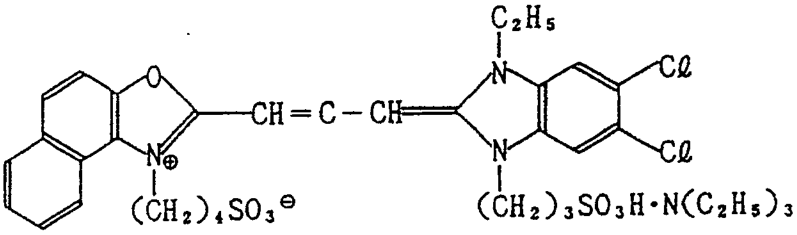

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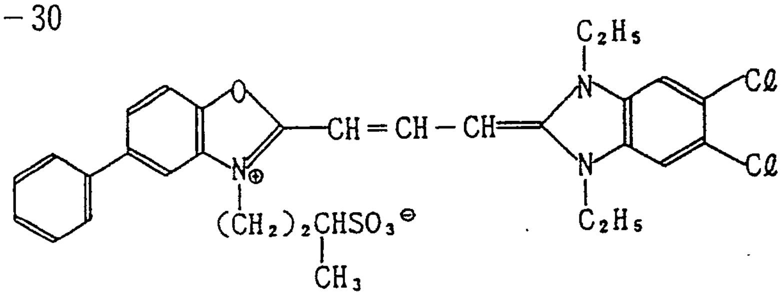
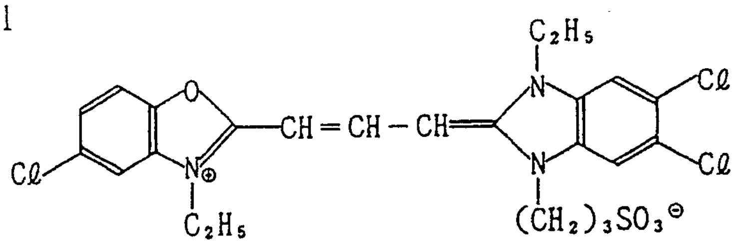
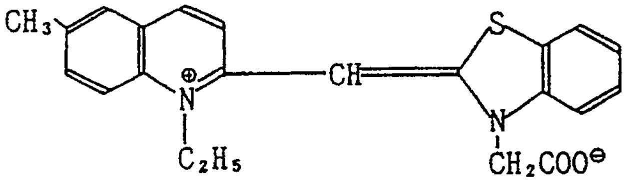


IV − 31



IV－32



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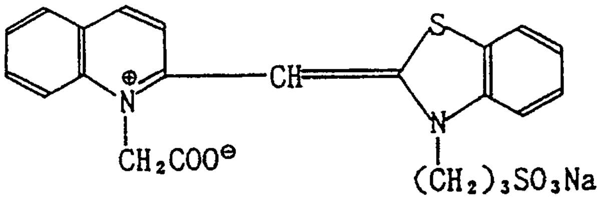

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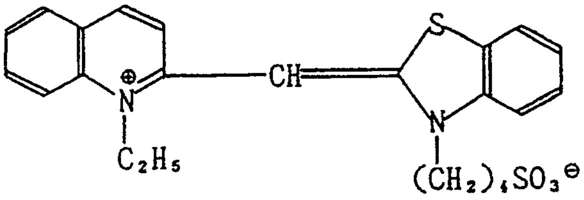

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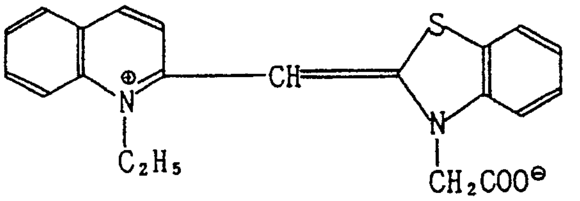

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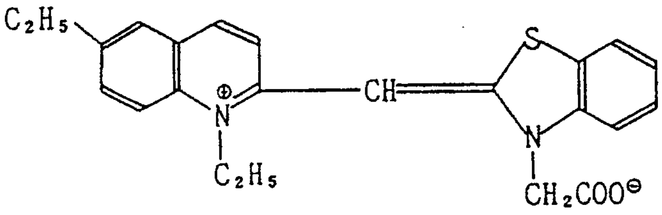

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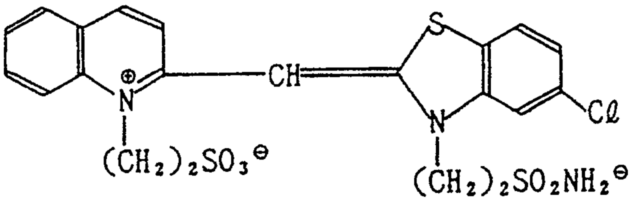
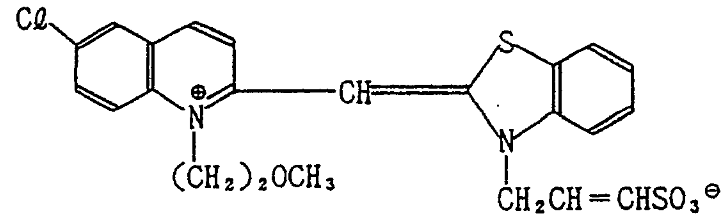
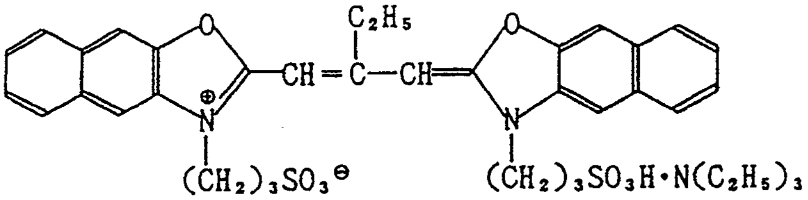


IV − 38



IV − 39



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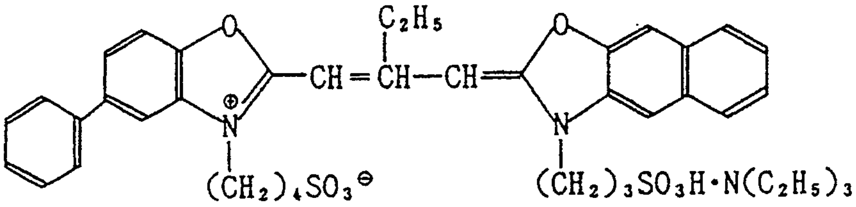
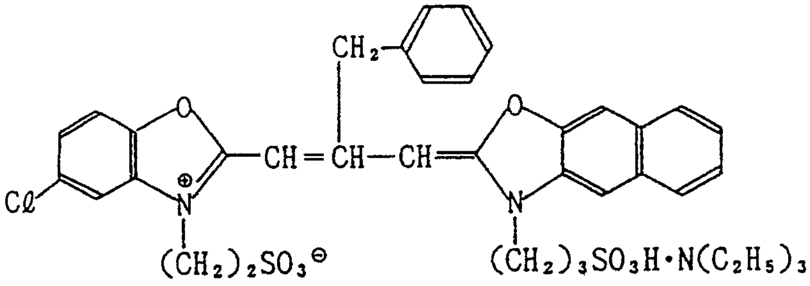


IV − 41



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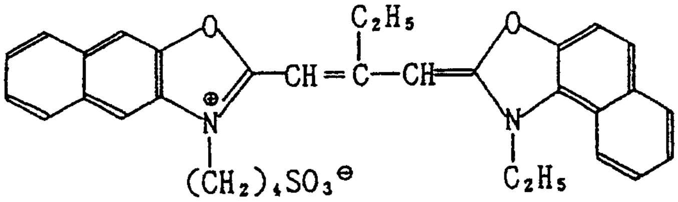

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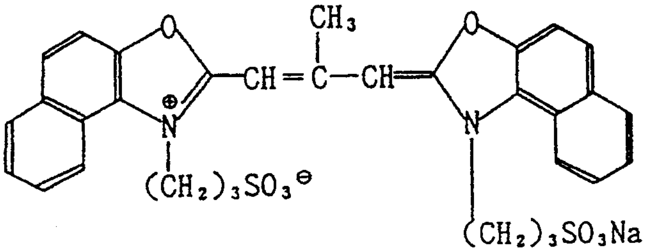

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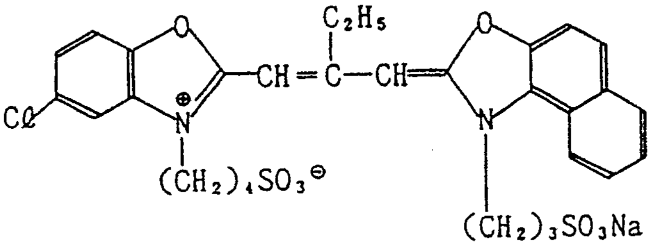

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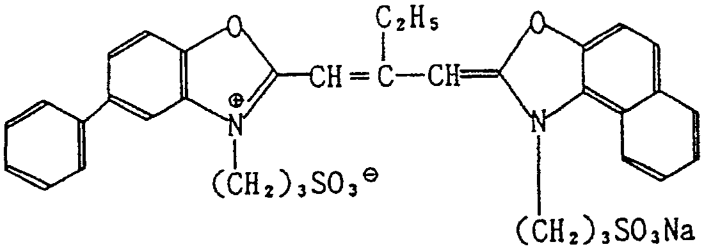

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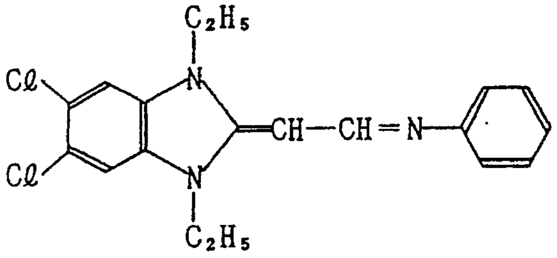

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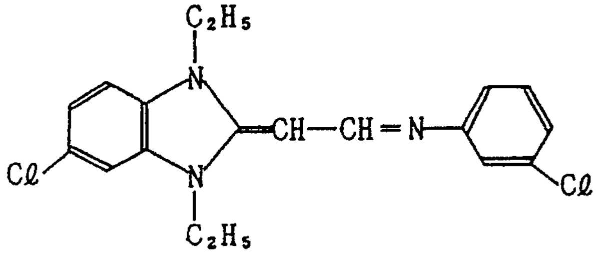

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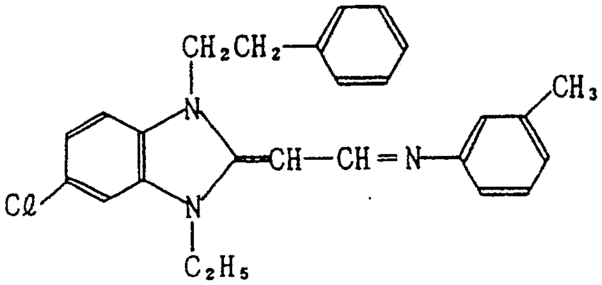

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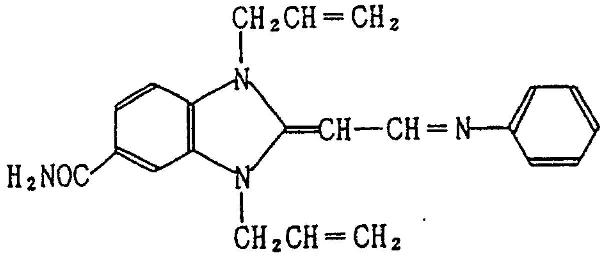

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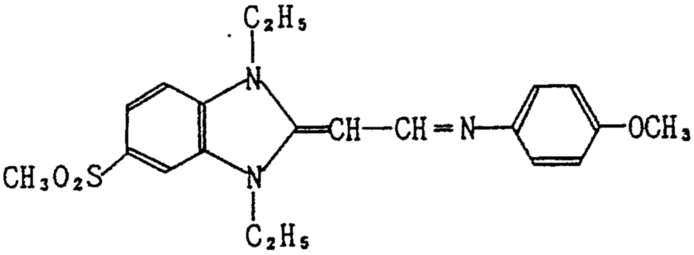

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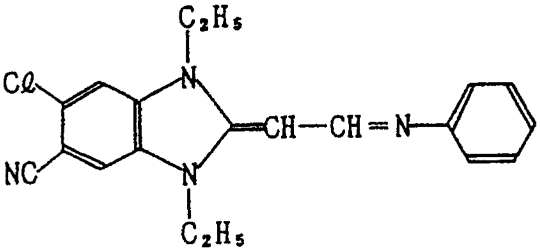

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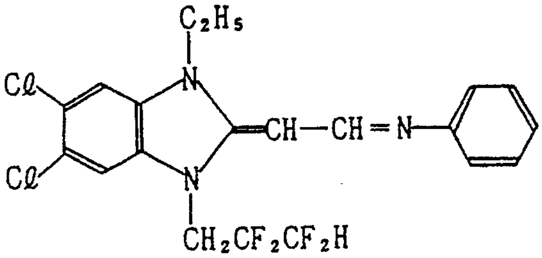

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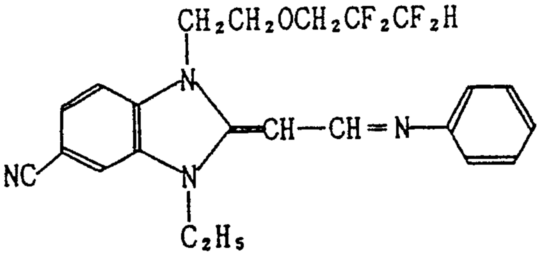


The development inhibitor releasing coupler, hereinafter referred to as DIR compound, used in the light-sensitive material of the invention is a coupler having a fragment at the coupling active site thereof, which fragment, when split off from the active site by a color developing reaction, becomes a development inhibitor or a development inhibitor precursor, and while when dissolved out in a developer solution, changes into a compound that does substantial not affect the photographic characteristics of the light-sensitive material.

The DIR compound used in the invention is preferably a hydrolysis-type DIR compound represented by the following

Formula V:

$$Cp-(T)_m-Z-(L\text{-}Y)_n$$

wherein Cp represents a coupler residue; Z is the base of a compound capable of acting as a development inhibitor, which is linked directly (when m is 0) or through a linkage group T (when m is 1) to the coupling position of the coupler; Y is a group is linked through L to Z and effects the development inhibiting action of Z, wherein the linkage group represented by L contains the chemical bond severed in a developer solution; m is an integer of 0 or 1; and n is an integer of 1 or 2, provided that when n is 2, each of -L-s and -Ys may be either the same or different.

The compound of Formula V, after the coupling reaction thereof with the oxidation product of a color developing agent, releases $^{\ominus}T\text{-}Z(L\text{-}Y)_n$, which has T come off immediately when m is 1 to thereby become $^{\ominus}Z(L\text{-}Y)_n$. The $^{\ominus}Z(L\text{-}y)_n$, while acting as a development inhibitor, is diffused into the light-sensitive layer and partially carried away into the color developer solution. The $^{\ominus}Z(L\text{-}Y)_n$ that has been carried in the developer solution is quickly decomposed at the chemical bonding portion contained in L, i.e., the linkage between Z and Y is severed, whereby the compound of less-development-inhibiting Z with a water-solubilizing group attached thereto remains in the developer solution, and as a result, the development-inhibiting action substantially disappears.

After all, no effective development-inhibiting compound is accumulated in the developer solution to thus make it possible not only to recycle the solution but also to incorporate a sufficient amount of a DIR compound into the light-sensitive material.

Preferred examples of the yellow dye image forming coupler residue represented by Cp include pivaloylacetanilide coupler residue, benzoylacetanilide coupler residue, malone-diester coupler residue, malonediamine coupler residue, benzoylmethane coupler residue, benzothiazolylacetamide coupler residue, malone-ester-monoamide coupler residue, benzothiazolyl-acetate coupler residue, benzoxazolylacetamide coupler residue, benzoxazolyl-acetate coupler residue, benzimidazolylacetamide coupler residue and benzimidazolyl-acetate coupler coupler residues; the coupler residues derived from the heterocyclic-substituted acetamide or heterocyclic-substituted acetate described in U.S. Patent No.3,841,880; the coupler residues derived from the acylamides described in U.S. Patent No. 3,770,446, British Patent No. 1,459,171, West German OLS Patent No. 2,503,099, JP O.P.I. No. 139738/1975, and Research Disclosure 15737; and the heterocyclic coupler residues described in U.S. Patent No. 4,046,574.

Preferred examples of the magenta dye image forming coupler residue represented by Cp include 5-oxo-2-pyrazoline nucleus-having residue, pyrazolo-[1,5-a]-benzimidazole nucleus-having residue, cyanoactophenone coupler residue and pyrazolotriazole nuclues-having coupler residue.

Preferred examples of the cyan dye image forming coupler residue represented by Cp include phenol nucleus-having coupler residue and α-naphthol nucleus-having nucleus.

Further, even if a coupler is one that does substantially not form a dye after the coupling reaction thereof with the oxidation product of a color developing reaction to release a development inhibitor, the effect of the coupler is the same as of the DIR coupler. The coupler residues of this type represented by Cp are described in U.S. Patent Nos. 4,052,213, 4,088,491, 3,632,345, 3,958,993 and 3,961,959.

The preferred residues as Cp are pivaloylacetanilide and benzoylacetanilide yellow dye image forming coupler residues, 5-oxo-2-pyrazoline nucleus magenta dye image forming coupler residues, α-naphthol nucleus cyan dye image forming coupler residues and hydrophilic group-substituted α-naphthol nucleus effluent dye forming coupler residues.

As the group represented by T there are (1) a group that effects a cleavage reaction by utilizing an electron-transfer reaction along a conjugated system. (2) a group that effects a cleavage reaction by utilizing an intramolecular nucleophilic substitution reaction, (3) a group that utilizes a hemiacetal cleavage reaction, (4) a group that utilizes an iminoketal cleavage reaction, and (5) a group that utilizes an ester hydrolysis cleavage reaction.

Examples of the group of (1) are described in JP O.P.I. Nos. 114946/1981, 154234/1982, 188035/1982, 98728/1983, 160954/1983, 209736/1958, 209737/1983. 209738/1983, 209739/1983, 209740/1983, 86361/1987 and 87958/1987.

Examples of the group of (2) are described in JP O.P.I. Nos. 56837/1982 and U.S. Patent No. 4,248,962.

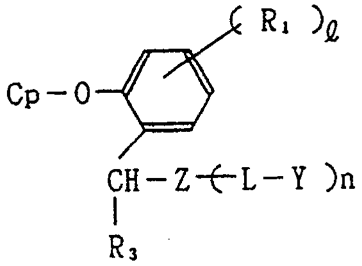
Examples of the group of (3) are described in JP O.P.I. Nos. 249148/1985 and 249149/1985, and U.S. Patent No. 4,146,396.

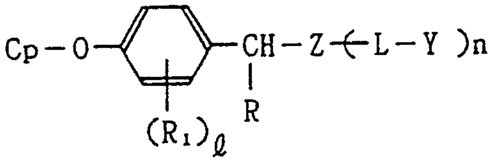
Examples of the group of (4) are described in U.S. Patent No. 4,546,073.

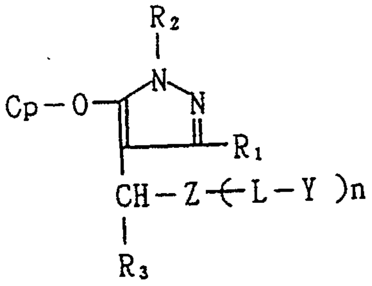
And examples of the group of (5) are described in West German OLS Patent No. 2,626,315.

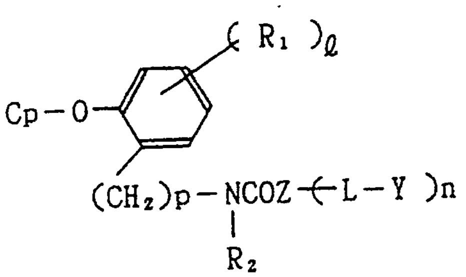
Preferred among the groups represented by T are the following groups, which are shown together with Cp and $Z\{L\text{-}Y)_n$.

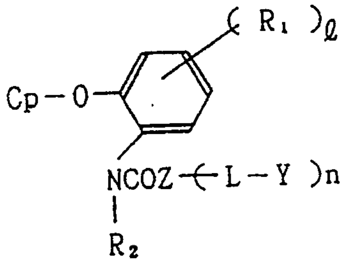
$Cp\text{-}OCH_2\text{-}Z\{L\text{-}Y)_n$
$Cp\text{-}SCH_2\text{-}Z\{L\text{-}Y)_n$
$Cp\text{-}OCO\text{-}Z\{L\text{-}Y)_n$









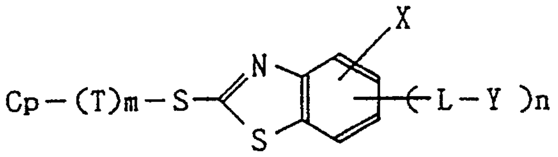


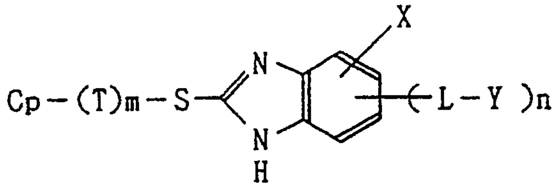
In the above, R_1 is a hydrogen atom, a halogen atom, an alkyl group, an alkenyl group, an aralkyl group, an alkoxy group, an alkoxycarbonyl group, an anilino group, an acylamino group, a ureido group, a cyano group, a nitro group, a sulfonamido group, a sulfamoyl group, a carbamoyl group, an aryl group, a carboxy group, a sulfo group, a cycloalkyl group, an alkanesulfonyl group, an arylsulfonyl group or an acyl group; R_2 and R_3 each are a hydrogen atom, an alkyl group, an alkenyl group, an aralkyl group, a cycloalkyl group or an aryl group; and n and 1 each are an integer of 1 or 2, provided that when 1 is 2, the R_1s may combine with each other to form a heterocyclic ring.

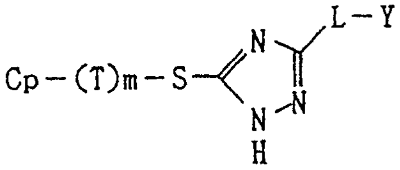
In these DIR compounds (when m is 1 in Formula V), the split-off group released after the reaction thereof with the oxidant of a color developing agent is immediately decomposed to release a development inhibitor $H\text{-}Z\{L\text{-}Y)_n$. Therefore, the effect of the DIR compound having no group represented by T (when m is 0 in Formula V) is the same as that of the invention.

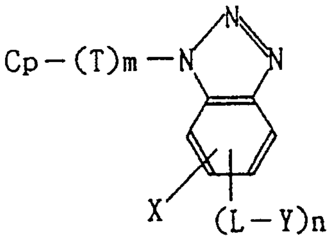
As the principal moiety of the development inhibitor represented by Z there are a divalent nitrogen-containing heterocyclic group and a nitrogen-containing heterocyclic thio group. Examples of the heterocyclic thio group include a tetrazolylthio group, a benzothiazolylthio group, a benzimidazolylthio group, a triazolylthio group and an imidazolylthio group.

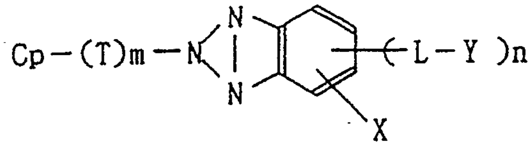
The following are the particular examples of the moiety of Z.

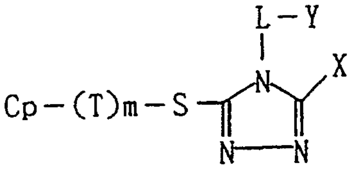

Cp－(T)m－S
N
S
X
(L－Y)n

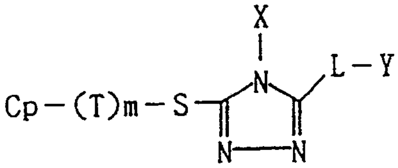

Cp－(T)m－S
N
N
H
X
(L－Y)n

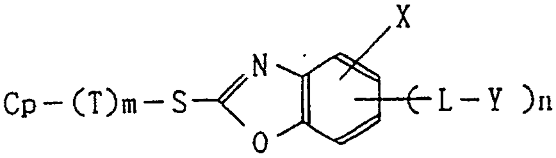

Cp－(T)m－S
N
N
N
H
L－Y

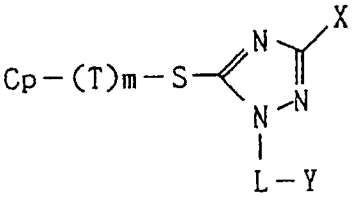

Cp－(T)m
N
N
N
X
(L－Y)n

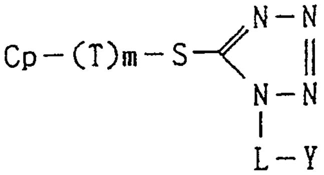


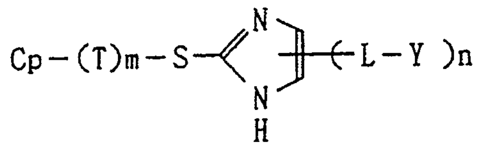


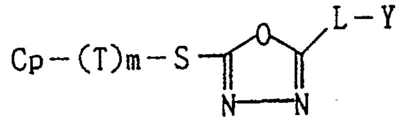


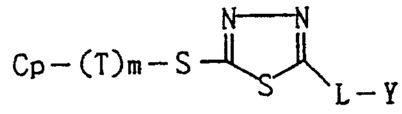












In the above formulas, the substituent represented by X is one contained in the part of Z in Formula V, and is a hydrogen atom, a halogen atom, an alkyl group, an alkenyl group, an alkaneamido group, an alkeneamido group, an alkoxy group, a sulfonamido group or an aryl group.

The group represented by Y in Formula V is an alkyl group, a cycloalkyl group, an alkenyl group, a cycloalkenyl group, an aryl group, an aralkyl group or a heterocyclic group.

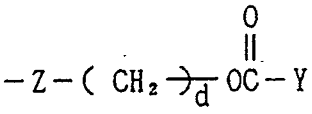
The linkage group represented by L in Formula V contains the chemical linkage cleavable in a developer solution. Examples of the chemical linkage include the following examples, which each are cleavable by a nucleophilic reagent such as a hydroxy ion or hydroxylamine, a component of a color developing agent, so that the effect of the invention can be obtained.

Chemical linkage contained in L	Linkage cleavage reaction (reaction with $^{\ominus}OH$)
-COO-	-COOH- + HO-
$-\overset{H}{N}COO-$	$-NH_2$ + HO-
$-SO_2O-$	$-SO_2H$ + HO-
$-OCH_2CH_2SO_2-$	-OH + $CH_2=CHSO_2-$
$-O\underset{\underset{O}{\|}}{C}O-$	-OH + HO-
$-NH\underset{\underset{O}{\|}}{C}\underset{\underset{O}{\|}}{C}O-$	$-NH_2$ + HO-

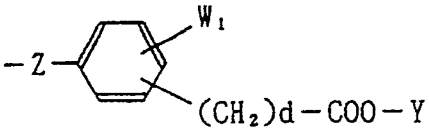
The divalent linkage group shown in the above table is linked directly or through an alkylene group and/or a phenylene group to Z, and directly to Y. Where the linkage group is linked through an alkylene group or a phenylene group to Z, the intermediary divalent group moiety may contain an ether linkage, an amido linkage, a carbonyl group, a thioether linkage, a sulfone group, a sulfonamido linkage or a urea linkage.

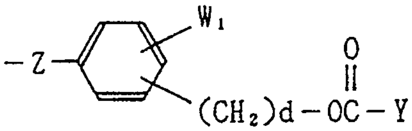
Rreferred examples of the linkage group represented by L are given below together with the Z and Y substituting positions.

$$-Z-(CH_2)_d COO-Y$$

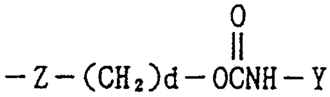


$$-Z-(CH_2)_d O\overset{O}{\overset{\|}{C}}-Y$$

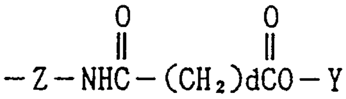




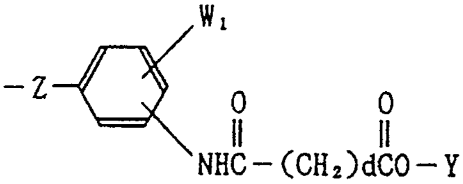
$$-Z-(CH_2)d-NHCOO-Y$$



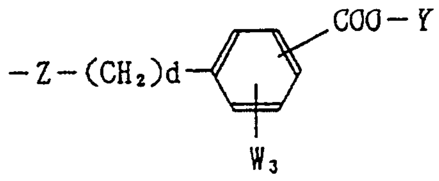
$$-Z-(CH_2)d-O\overset{O}{\overset{\|}{C}}NH-Y$$

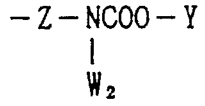


$$-Z-NH\overset{O}{\overset{\|}{C}}-(CH_2)d\overset{O}{\overset{\|}{C}}O-Y$$

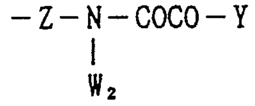


$$-Z-(CH_2)_d-COOCH_2CH_2SO_2-Y$$





$$-Z-\underset{\displaystyle W_2}{\underset{|}{N}}COO-Y$$



$$-Z-\underset{\displaystyle W_2}{\underset{|}{N}}-COCO-Y$$

In the above formulas, d is an integer of 0 to 10, preferably 0 to 5; and W_1 is selected from among a hydrogen atom, a halogen atom, an alkyl group having 1 to 10 carbon atoms, preferably 1 to 5 carbon atoms, an alkaneamido group having 1 to 10 carbon atoms, preferably 1 to 5 carbon atoms, an alkoxy group having 1 to 10 carbon atoms, preferably 1 to 5 carbon atoms, an alkoxycarbonyl group having 1 to 10 carbon atoms, preferably 1 to 5 carbon atoms, an aryloxycarbonyl group, an alkanesulfonamido group having 1 to 10 carbon atoms, preferably 1 to 5 carbon atoms, an aryl group, a carbamoyl group, an N-alkylcarbamoyl group having 1 to 10 carbon atoms, preferably 1 to 5 carbon atoms, a nitro group, a cyano group, an arylsulfonamido group, a sulfamoyl group and an imido group. W_2 is a hydrogen atom or an alkyl having 1 to 6 carbon atoms, aryl or alkenyl group; W_3 is a hydrogen atom, a halogen atom, a nitro group, an alkoxy or alkyl group having 1 to 6 carbon atoms; and p is an integer of 0 to 6.

The alkyl or alkenyl group represented by X or Y is more particularly a straight-chain, branched-chain or cyclic alkyl or alkenyl group having 1 to 10 carbon atoms, preferably 1 to 5 carbon atoms, and more preferably having a substituent which is selected from among a halogen atom, a nitro group, an alkoxy group having 1 to 4 carbon atoms, an aryloxy group having 6 to 10 carbon atoms, an alkanesulfonyl group having 1 to 4 carbon atoms, an arylsulfonyl group having 6 to 10 carbon atoms, an alkaneamido group having 1 to 5 carbon atoms, an anilino group, a benzamido group, a carbamoyl group substituted with an alkyl group having 1 to 6 carbon atoms, a carbamoyl group, a carbamoyl group substituted with an aryl group having 6 to 10 carbons, an alkylsulfonamido group having 1 to 4 carbon atoms, an arylsulfonamido group having 6 to 10 carbon atoms, an alkylthio group having 1 to 4 carbon atoms, an arylthio group having 6 to 10 carbon atoms, a phthalimido group, a succinimido group, an imidazolyl group, a 1,2,4-triazolyl group, a pyrazolyl group, a benzotriazolyl group, a furyl group, a benzothiazolyl group, an alkylamino group having 1 to 4 carbons, an alkanoyl group having 1 to 4 carbon atoms, a benzoyl group, an alkanoyloxy group having 1 to 4 carbon atoms, a benzoyloxy group, a perfluoroalkyl group having 1 to 4 carbon atoms, a cyano group, a tetrazolyl group, a hydroxy group, a carboxyl group, a mercapto group, sulfo group, an amino group, an alkylsulfamoyl group having 1 to 4 carbon atoms, an arylsulfamoyl group having 6 to 10 carbon atoms, a morpholino group, an aryl group having 6 to 10 carbon atoms, a pyrrolidinyl group, a ureido group, a urethane group, an alkoxy-substituted carbonyl group having 1 to 6 carbon atoms, a carbonyl group substituted with an aryloxy group having 6 to 10 carbon atoms, an imidazolyl group, and an alkylideneamino group having 1 to 6 carbon atoms.

The alkaneamido or alkeneamido group represented by X is more particularly a straight-chain, branched-chain or cyclic alkaneamido or alkeneimido group having 1 to 10 carbon atoms, preferably 1 to 5 carbon atoms, and may have a substituent. The substituent may be selected from among the previously enumerated substituents for the foregoing alkyl and alkenyl groups.

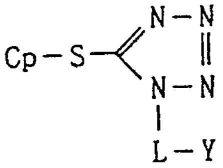
The alkoxy group represented by X is a straight-chain, branched-chain or cyclic alkoxy group having 1 to 5 carbon atoms and may have a substituent. The substituent may be selected from among the previously enumerated substituents for the foregoing alkyl and alkenyl groups.

The aryl group represented by Y is a phenyl or naphthyl group, which may have a substituent. The substituent may be selected from among the substituents previously enumerated for the foregoing alkyl and alkenyl groups and an alkyl group having 1 to 4 carbon atoms.

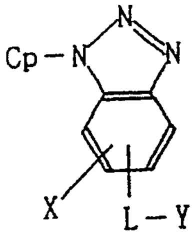
The heterocyclic group represented by Y is selected from among a diazolyl group such as 2-imidazolyl and 4-pyrazolyl, a triazolyl group such as 1,2,4-triazole-3-yl, a thiazolyl group such as 2-benzothiazolyl, an oxazolyl group such as 1,3-oxa-zole-2-yl, a pyrrolyl group, a pyridyl group, a diazonyl group such as 1,4-diazine-2-yl, a triazinyl group such as 1,2,4-triazine-5-yl, a furyl group, a diazolinyl group such as imidazoline-2-yl, a pyrrolinyl group and a thienyl group.

Useful ones of the DIR compounds represented by Formula V are those having Formulas VI, VII, VIII, IX, X, XI, XII, XIII and XIV. These DIR compounds are preferable in respect that the development inhibiting characteristic of the development inhibitor split off therefrom is strong.

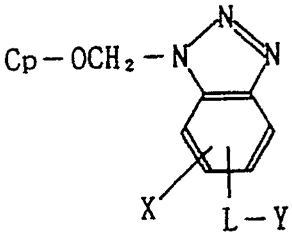
Formula VI



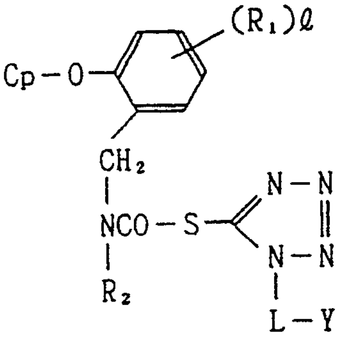
Formula VII



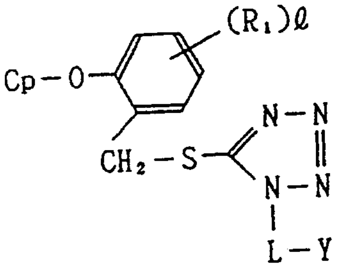
Formula VIII



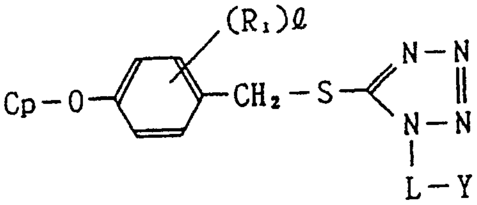
Formula IX



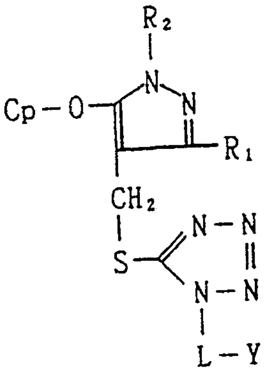
Formula X



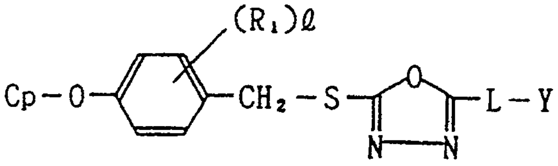
Formula XI



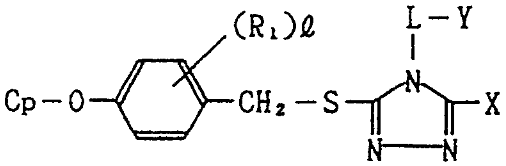
Formula XII



Formula XIII



Formula XIV



The development inhibitor from the DIR coupler of the invention is required to have a given decomposition rate constant. That is, the half life, $T_{\frac{1}{2}}$ of the development inhibitor at pH 10.0 is required to be not more than 4 hours, preferably not more than 2 hours, and most preferably not more than 1 hour.

In the invention, the half life of the development inhibitor or development inhibitor precursor can be easily measured in accordance with the following method: The development inhibitor is added so as to have a concentration of $1x10^{-4}$mol per liter to a color developer solution having the following composition, the solution is maintained at 38°C, and the remaining development inhibitor concentration is then determined according to liquid chromatography.

Diethylenetriaminepentaacetic acid	0.8 g
1-Hydroxyethylidene-1,1-diphosphonic acid	3.3 g
Sodium sulfite	4.0 g
Potassium carbonate	30.0 g
Potassium bromide	1.4 g
Potassium iodide	1.3 mg
Hydroxylamine sulfate	2.4 g
4-(N-ethyl-N-β-hydroxyethylamino)-2-methyl-aniline sulfate	4.5 g

Water to make 1 liter. Adjust pH to 10.

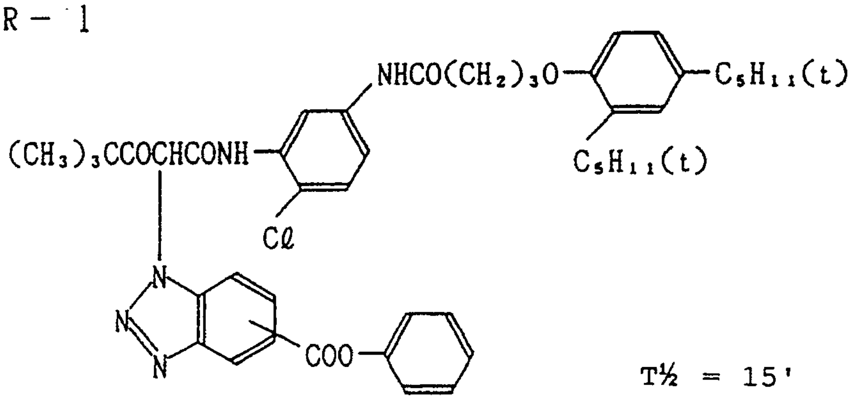
The DIR compounds used in the invention are known compounds, and can be easily synthesized in accordance with the methods described in JP O.P.I. Nos. 151944/1982, 205150/1983, 218644/1985, 221750/1985, 233650/1985 and 11743/1986.

These DIR compounds may be added to either light-sensitive emulsion layers or non-light-sensitive layers. The adding amount thereof is preferably $1x10^{-4}$ mol% to $1x10^{-1}$ mol% of the whole coating weight of silver.

The DIR compound of Formula V may be added to any one of or two or more of the layers of the light-sensitive material of the invention, such as the antihalation layer, intermediate layer between different color-sensitive layers, between the same color-sensitive layers or between non-light-sensitive layers, light-sensitive silver halide emulsion layers, yellow filter layer and protective layer. Particularly preferred among these layers is a green-sensitive emulsion layer to which the DIR compound is to be added. The light-sensitive material may contain a mixture of two or more kinds of the compound.

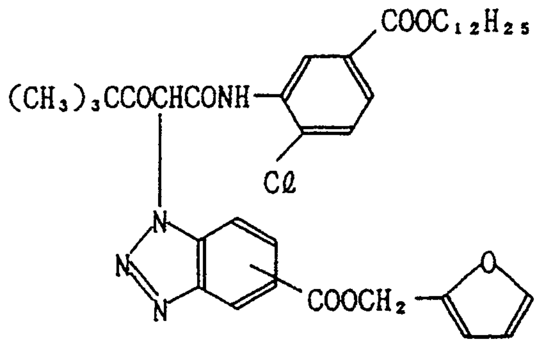
The following are the examples of the DIR compound of the invention, but are not limited thereto.

DIR-1



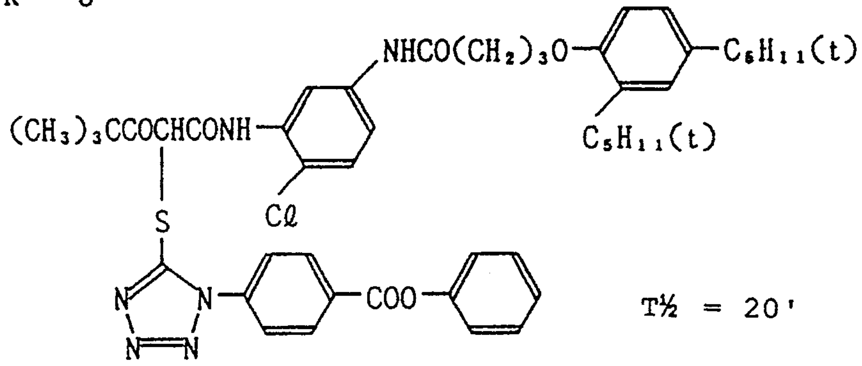
T½ = 15'

DIR－ 2



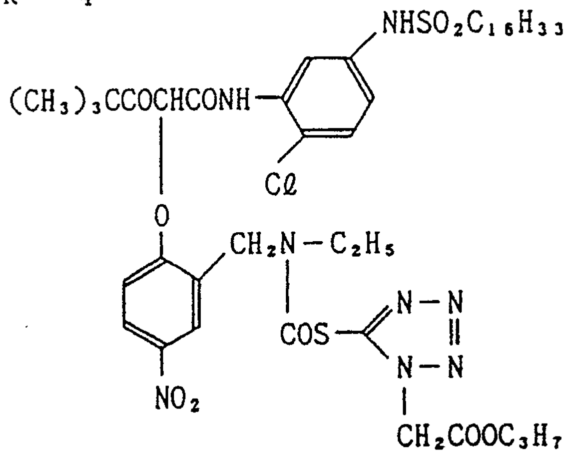
T½ = 60'

DIR－ 3



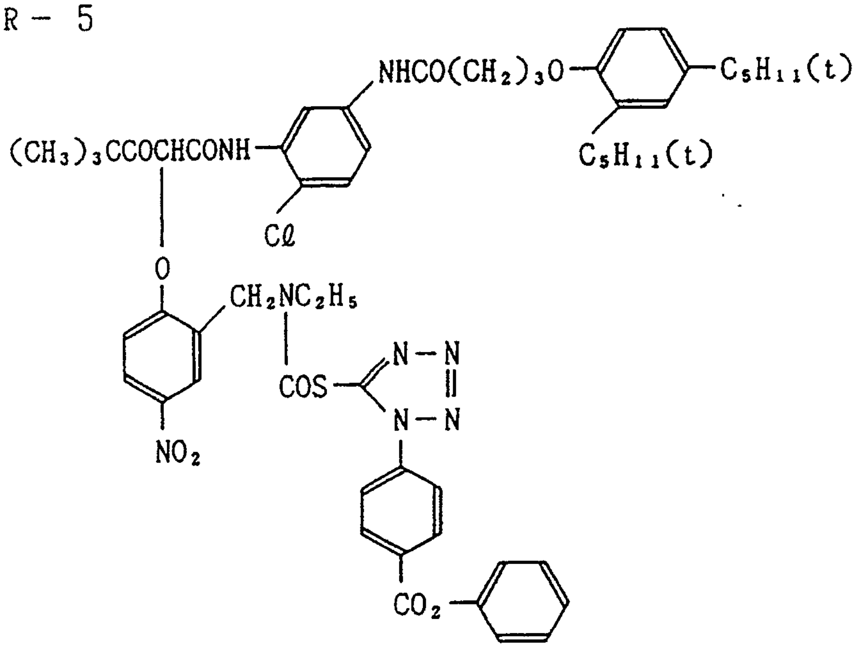
T½ = 20'

DIR－ 4



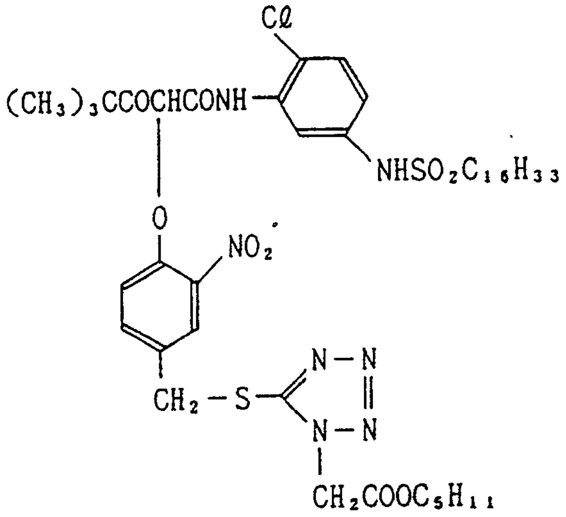
T½ = 15'

DIR- 5



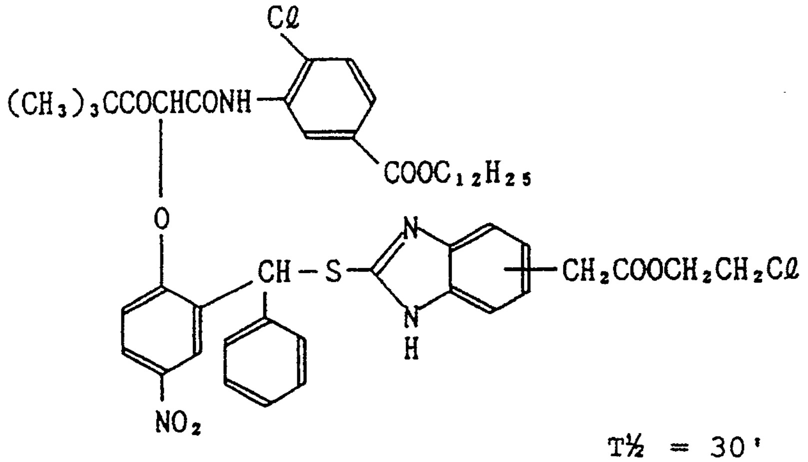
T½ = 20'

DIR- 6



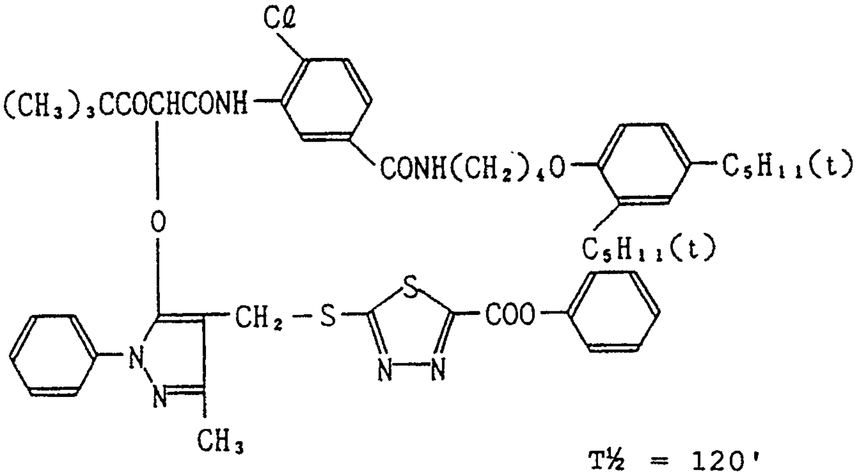
T½ = 15'

DIR－ 7



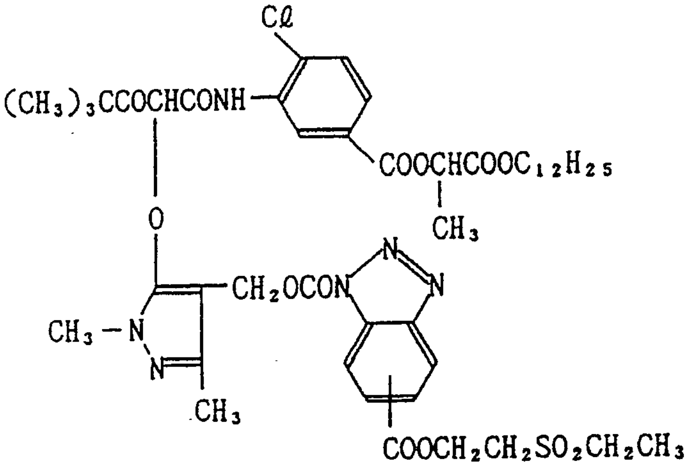
T½ = 30'

DIR－ 8



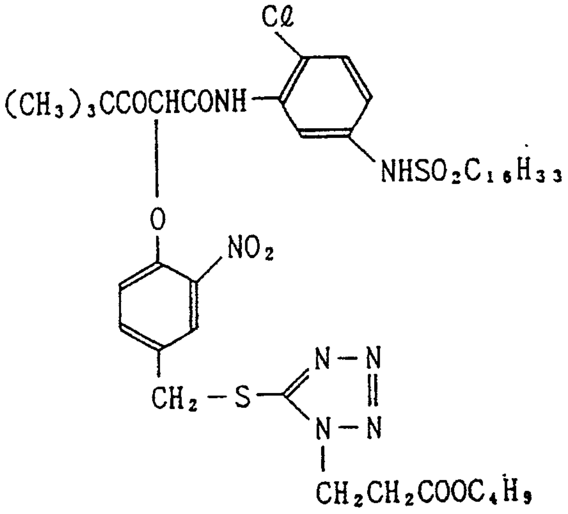
T½ = 120'

DIR－ 9



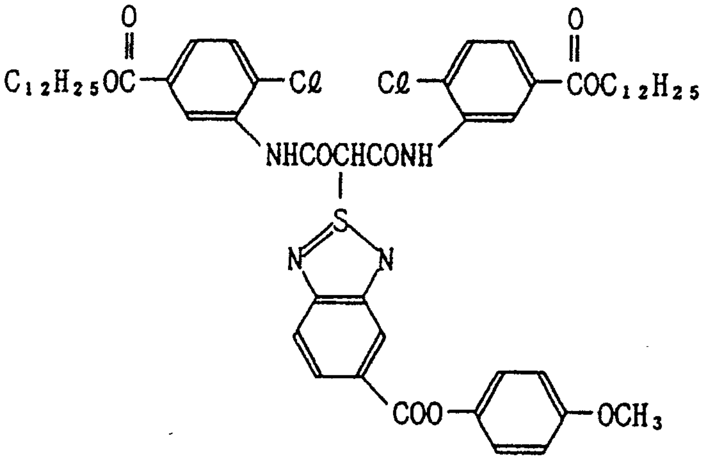
T½ ＝ 30'

DIR－ 10



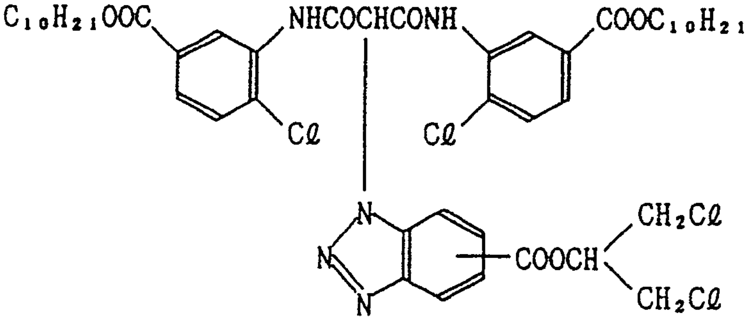
T½ ＝ 60'

DIR－11



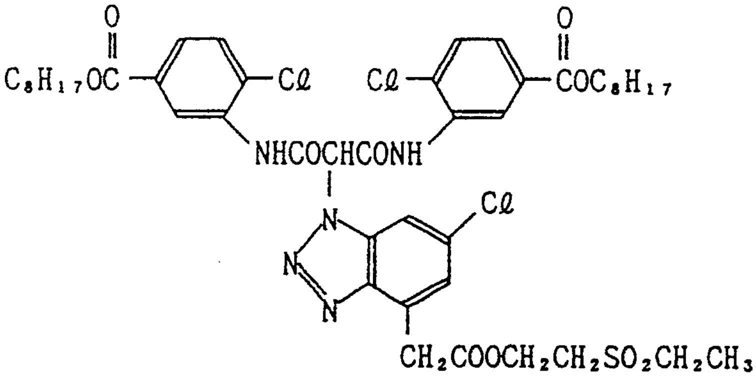
T½ = 15'

DIR－12



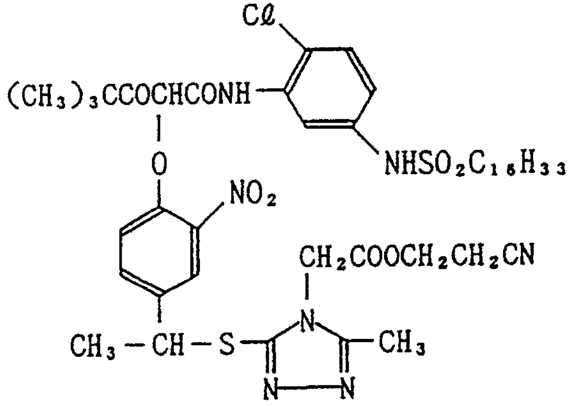
T½ = 30'

DIR－13



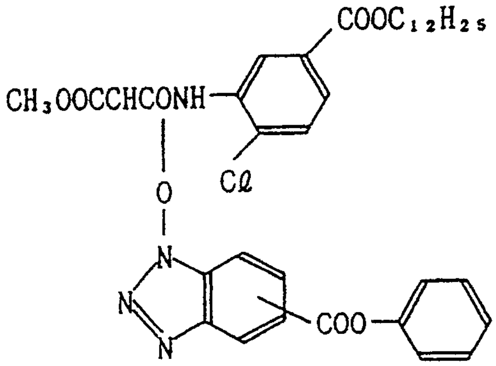
T½ = 30'

DIR－14



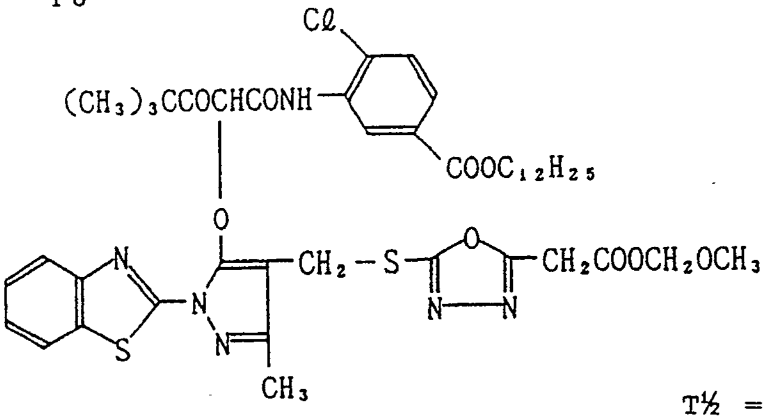
T½ = 60'

DIR－15



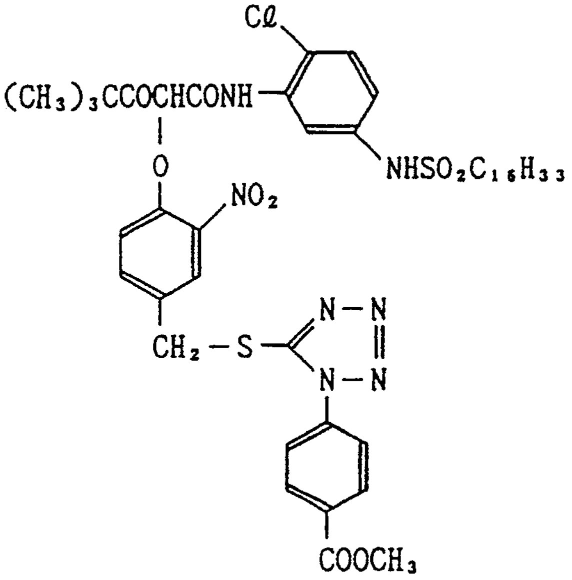
T½ = 15'

DIR－16



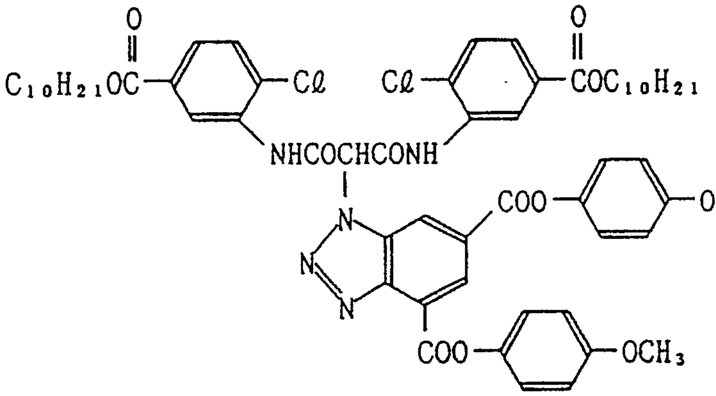
T½ = 5'

DIR－17



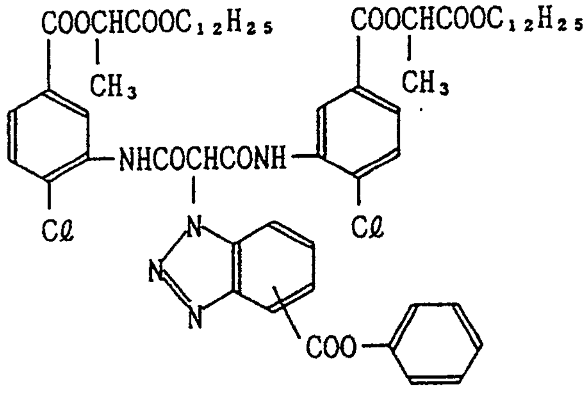
T½ = 120'

DIR－18



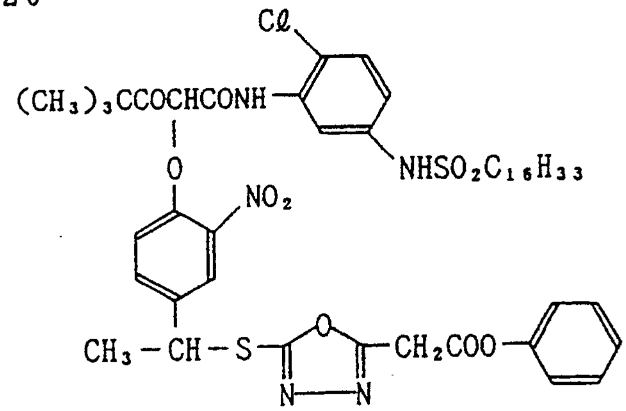
T½ = 15'

DIR－19



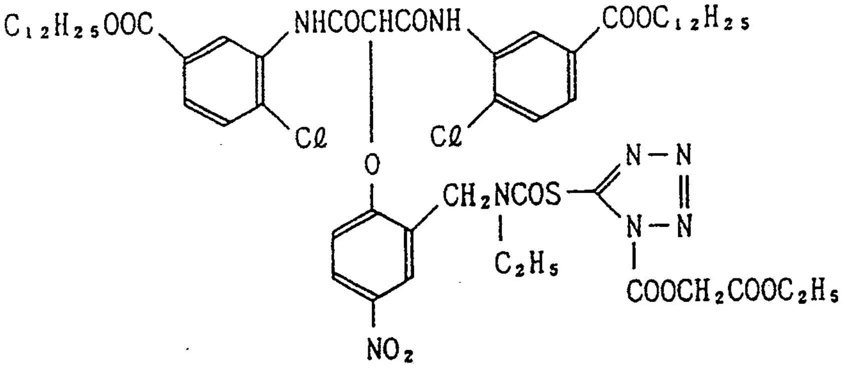
T½ = 15'

DIR－20



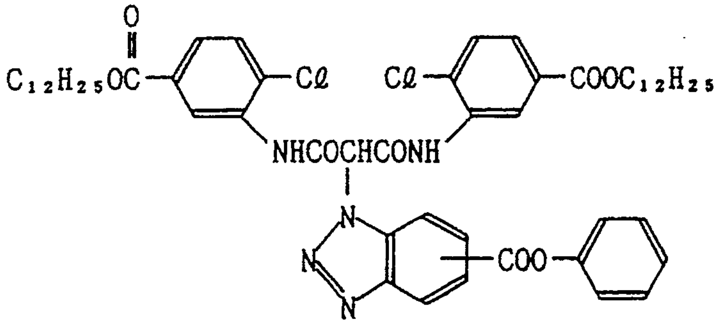
T½ = 3'

DIR－21



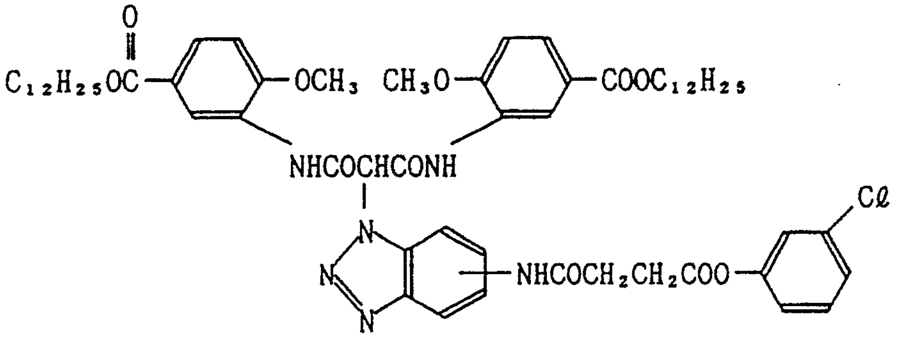
T½ = 90'

DIR－22



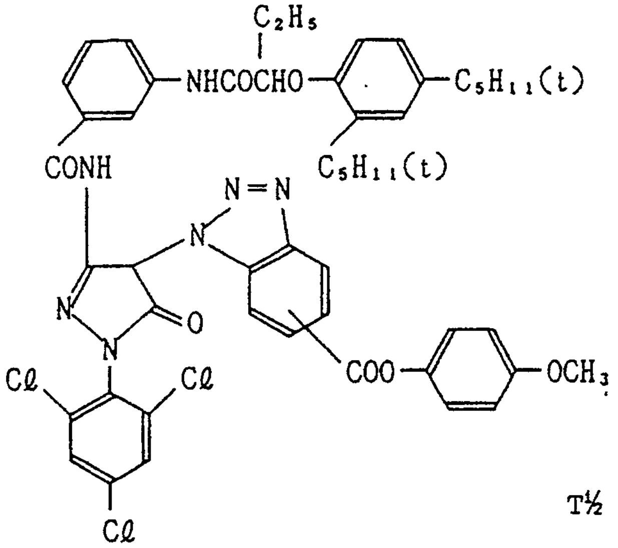
T½ = 15'

DIR－23



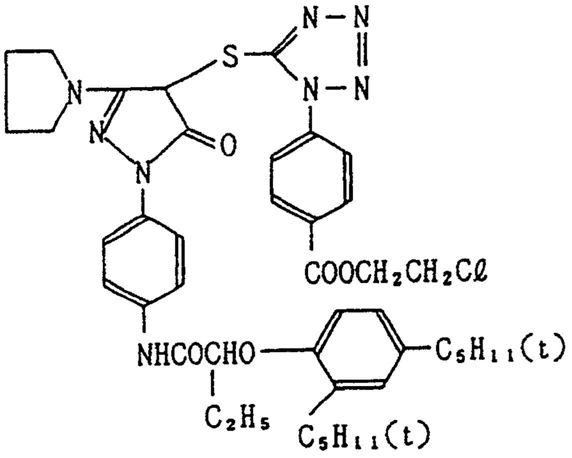
T½ = 90'

DIR－24



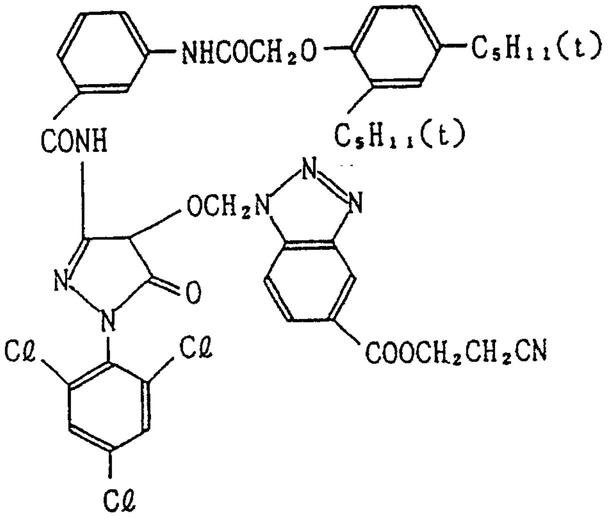
T½ = 15'

DIR－25



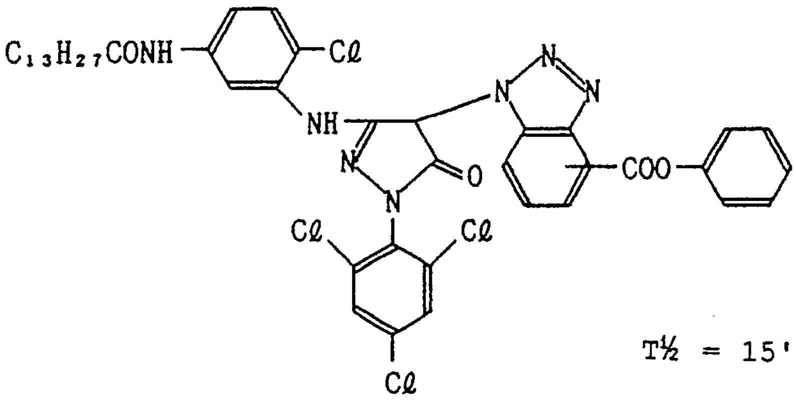
T½ = 60'

DIR－26



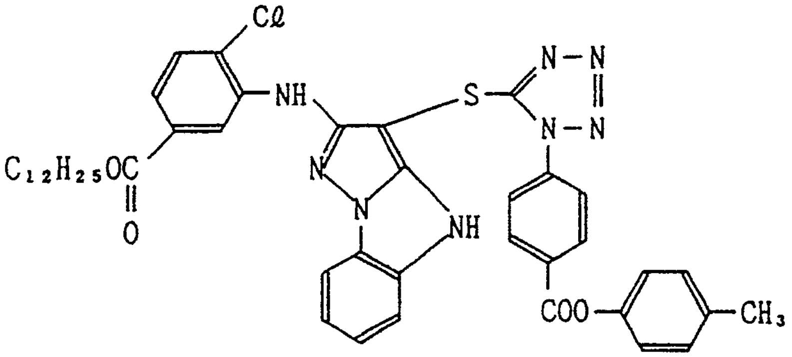
T½ = 30'

DIR-27



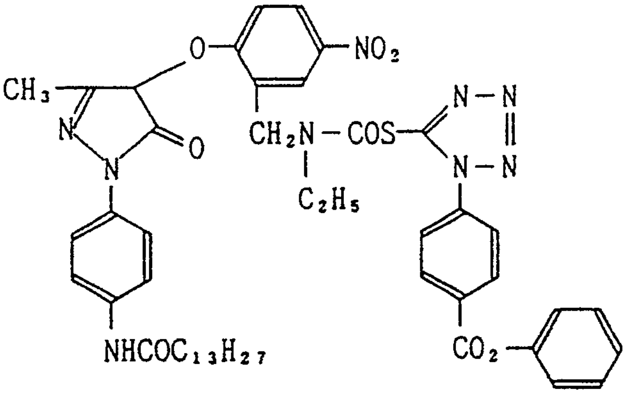
T½ = 15'

DIR-28



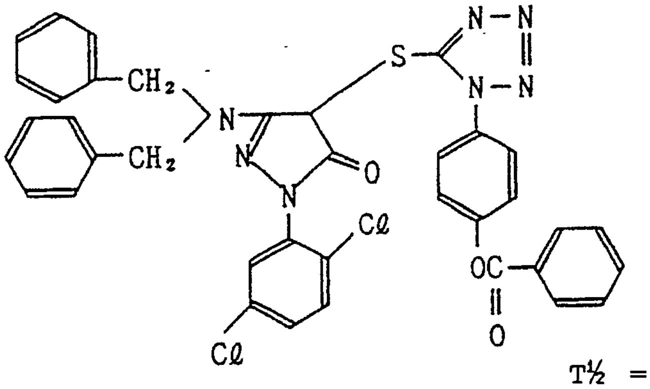
T½ = 20'

DIR-29



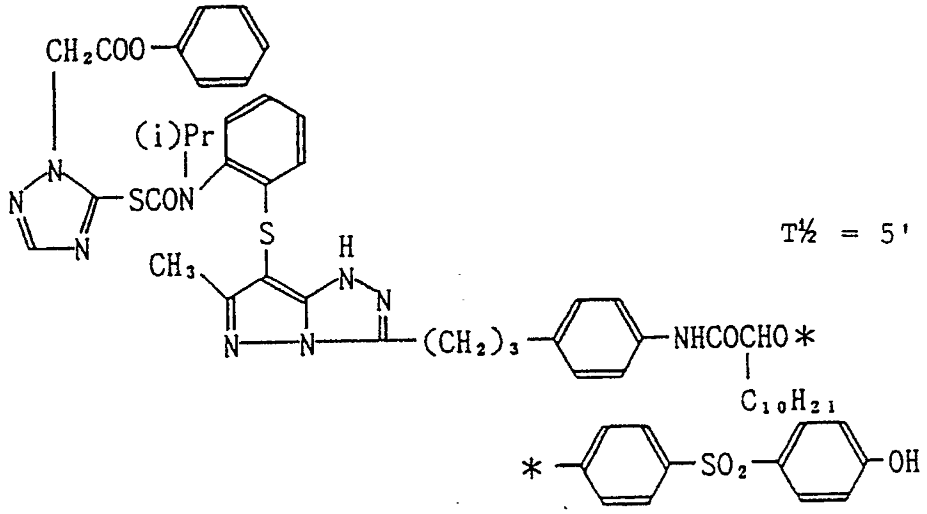
T½ = 20'

DIR－30



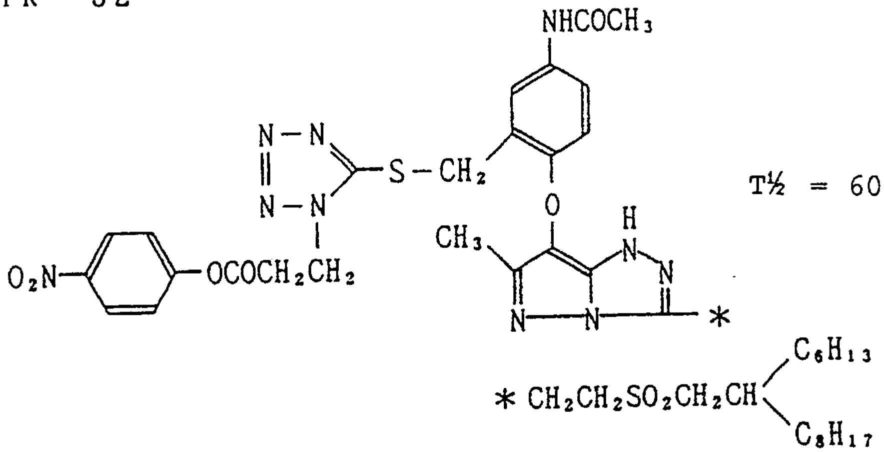
T½ = 20'

DIR－31



T½ = 5'

DIR－32



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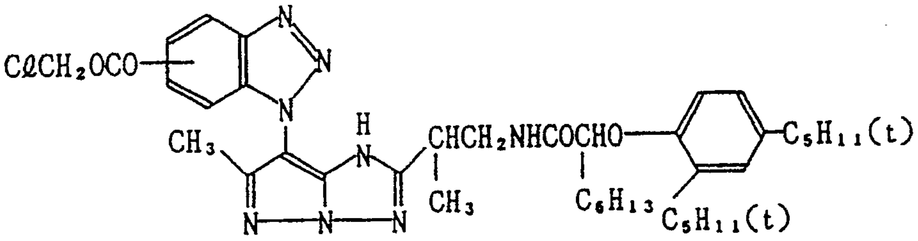
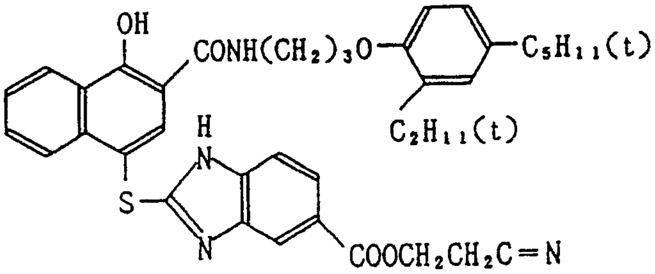
DIR－33



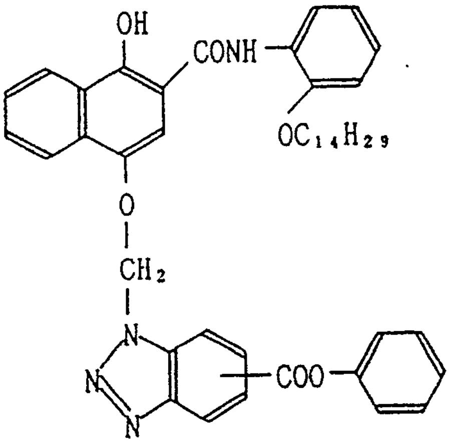
T½ = 30'

DIR－34



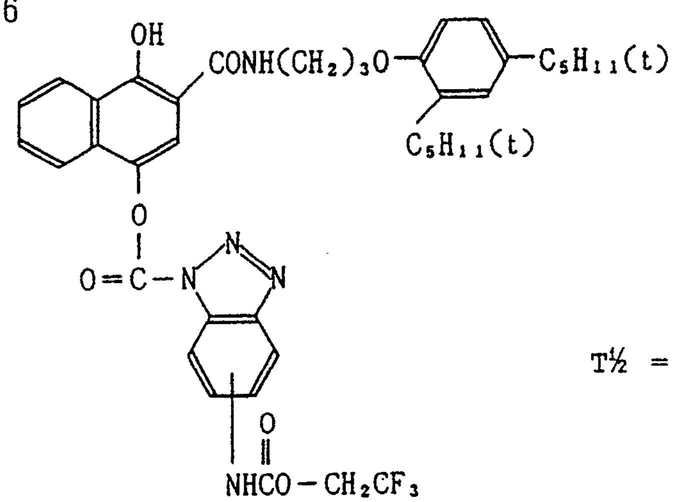
T½ = 60'

DIR－35



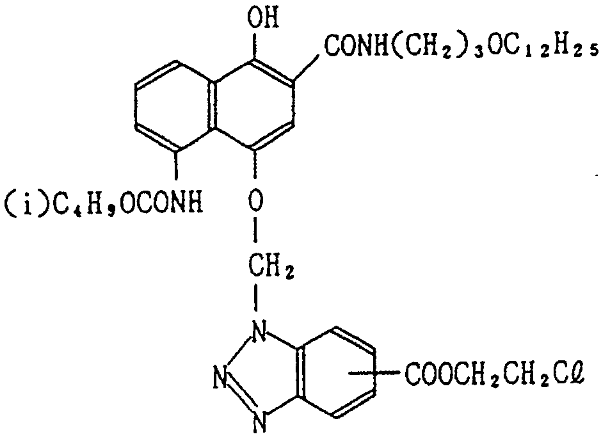
T½ = 15'

DIR－36



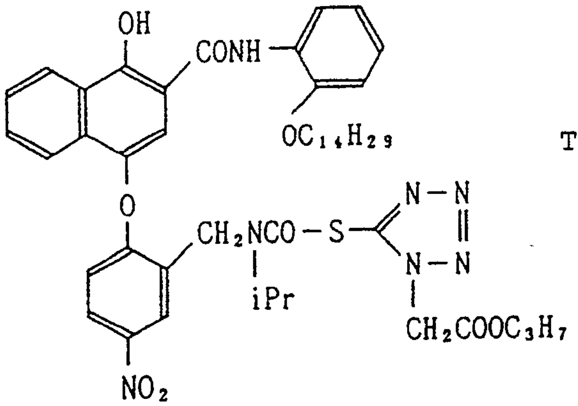
T½ = 60'

DIR－37



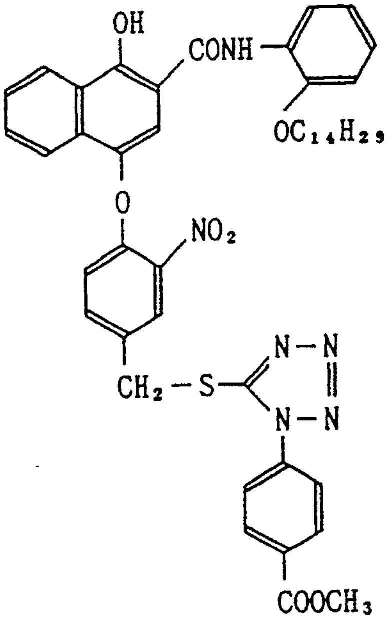
T½ = 60'

DIR－38



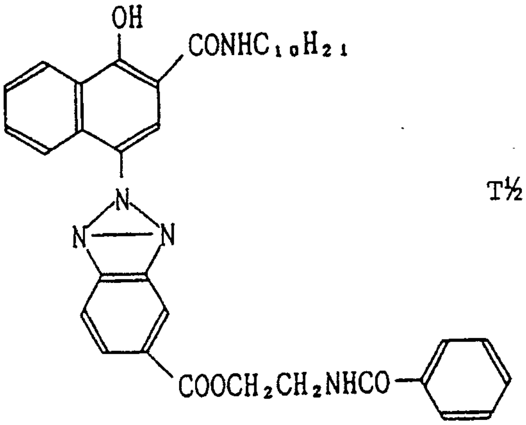
T½ = 15'

DIR－39



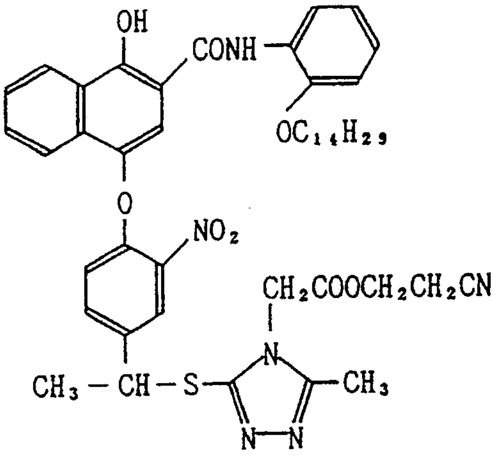
T½ = 120'

DIR－40



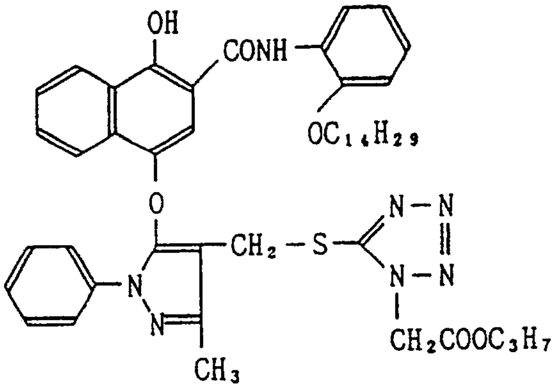
T½ = 60'

DIR－41



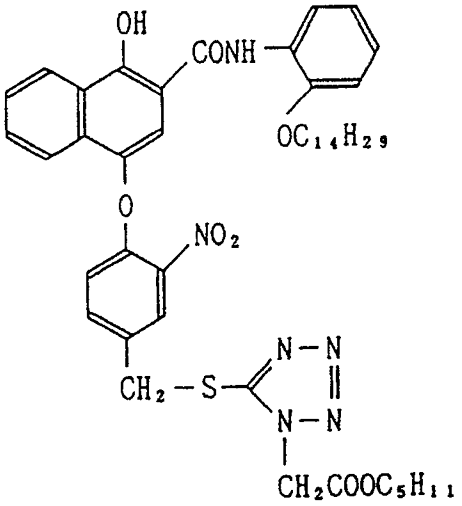
T½ = 60'

DIR－42



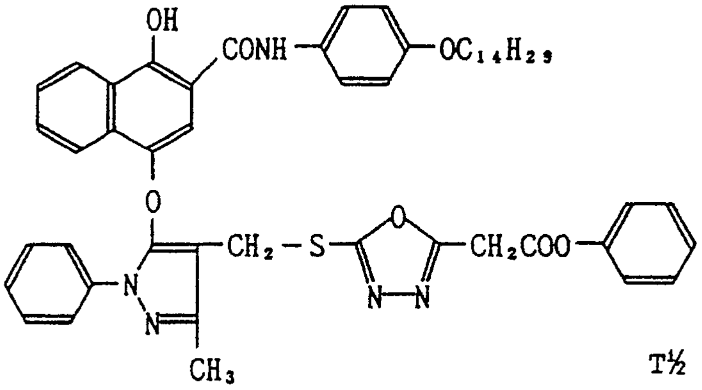
T½ = 15'

DIR－43



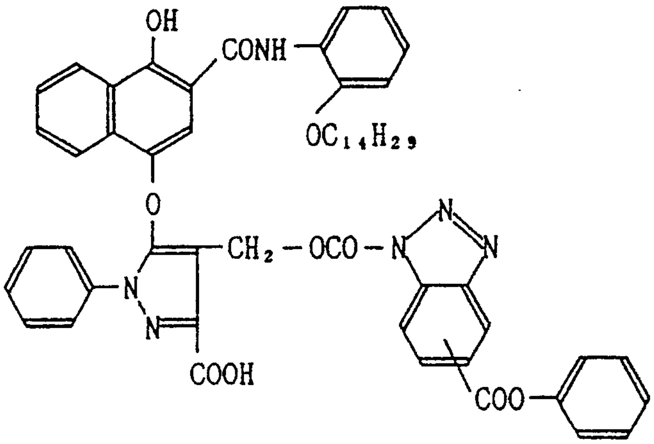
T½ = 15'

DIR－44



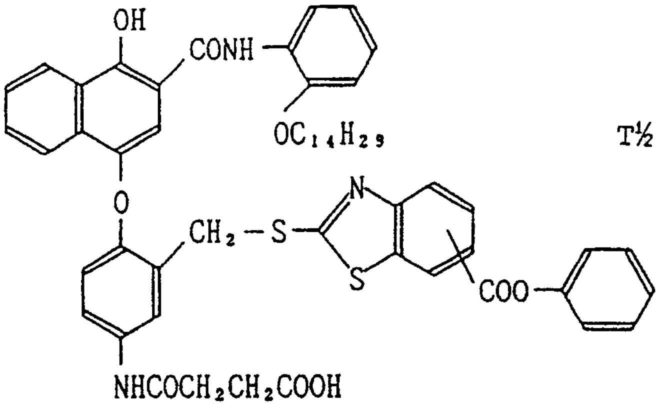
T½ = 5'

DIR－45



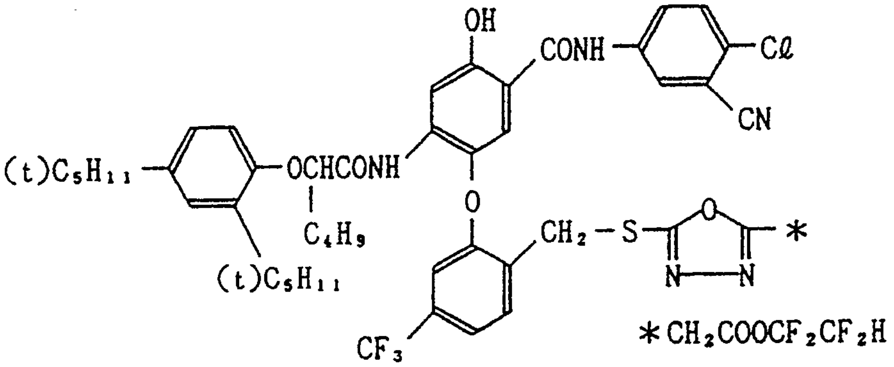
T½ = 15'

DIR－46



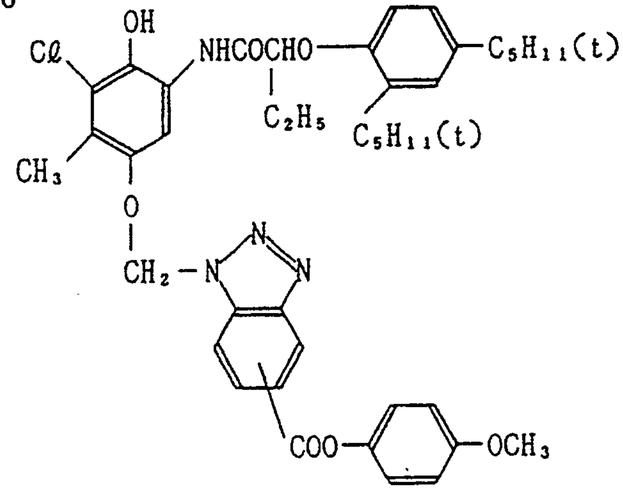
T½ = 15'

DIR－47



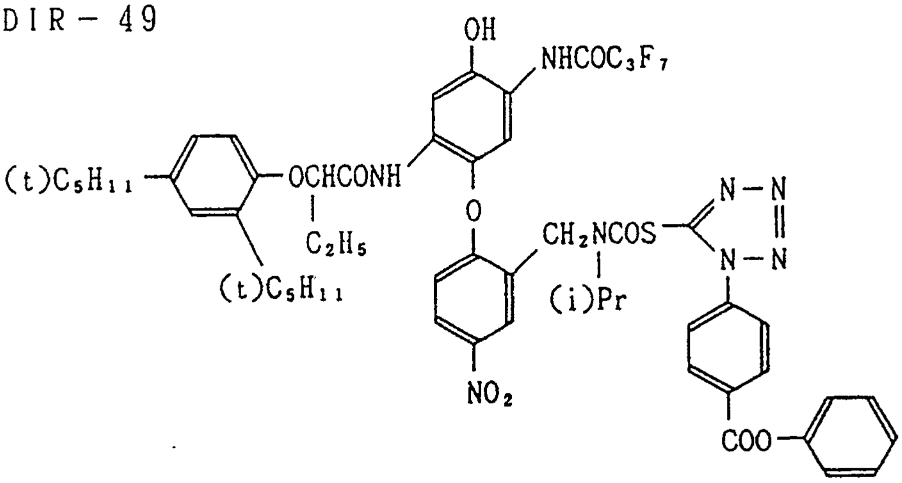
T½ ＝ 3'

DIR－48



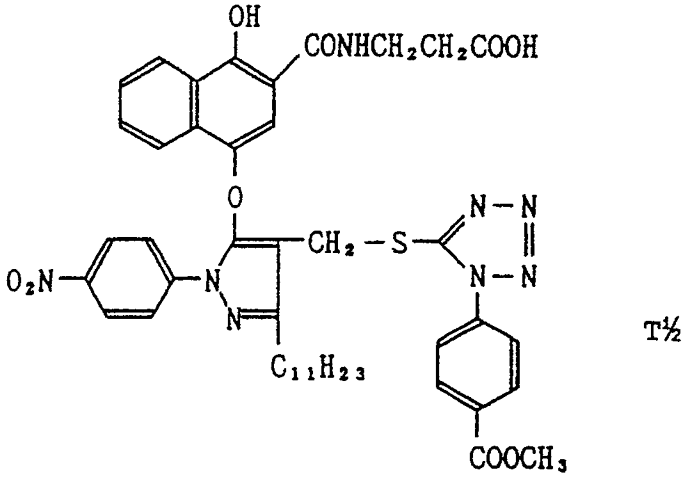
T½ ＝ 15'

DIR－49



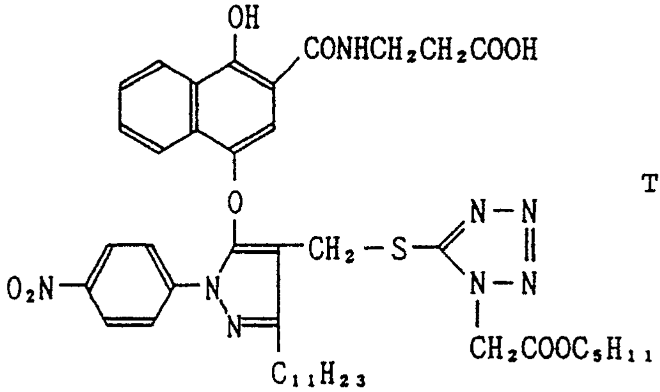
T½ ＝ 20'

DIR－50



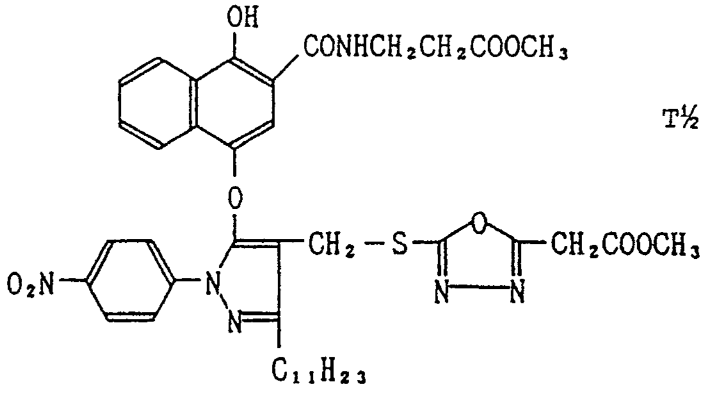
T½ = 120'

DIR－51



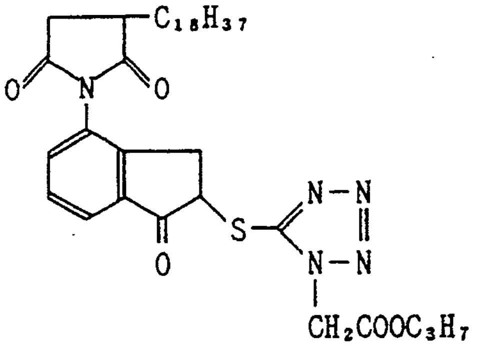
T½ = 15'

DIR－52



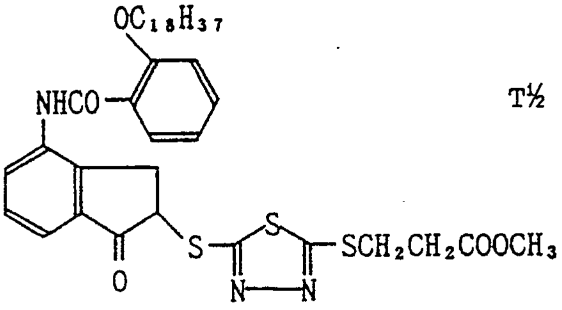
T½ = 3'

DIR-53



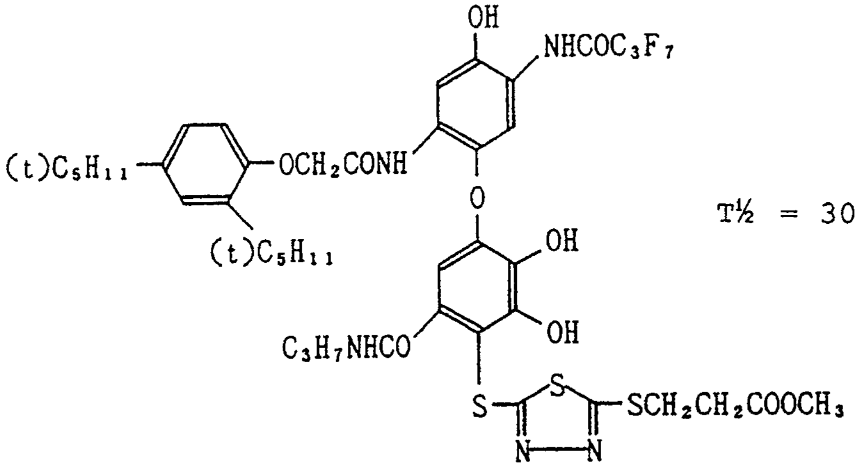
T½ = 15'

DIR-54



T½ = 30'

DIR-55



T½ = 30'

The known photographic additives applicable to the invention are described in the following Research Disclosure (abbreviated to RD) Nos. 308119, 17463 and 18716.

Various couplers may be used in the invention. Examples of the couplers applicable to the invention are described in the above RD Nos. 308119 and 17643.

The additives used in the invention may be added in accordance with the dispersing methods described in RD308119 XIV.

Any one of the materials described in the foregoing RD-17643, p.28; RD18716, p.647-648; and RD308119, X VII, may be used as the support of the light-sensitive material of the invention.

The light-sensitive material of the invention may have auxiliary layers such as the filter layer and intermediate layer described in the foregoing RD308119.

The layers of the light-sensitive material of the invention may be formed in various arrangements such as the normal layer arrangement, inverse layer arrangement and unit layer arrangement described in the foregoing RD308119 VII-K.

The invention may be applied to various color light-sensitive materials such as color negative films for general and movie use, color reversal films for slide and TV use, color photographic paper, color positive film and color reversal paper.

The light-sensitive material of the invention may be processed in the usual manner as described in the foregoing RD-17643, p.28-29; RD18716, p.647; and RD308119, X VII.

EXAMPLES

In all the following examples, the adding amount of silver halide and colloidal silver is shown in silver equivalent, that of sensitizing dyes in mols per mol of silver, and that of other additives in grams per m^2 unless otherwise stated.

Example 1

A multilayer color photographic light-sensitive material Sample 101 was prepared by coating on a triacetyl cellulose film support the following layers in order from the support side.

Layer 1: Antihalation layer HC-1	
Black colloidal silver	0.2
UV absorbent layer UV-1	0.15
High-boiling solvent Oil-1	0.15
Gelatin	1.4

Layer 2: First intermediate layer IL-1	
Gelatin	1.3
UV absorbent layer UV-1	0.1
High-boiling solvent Oil-1	0.1

Layer 3: Low-speed red-sensitive emulsion layer RL	
Silver iodobromide emulsion Em-1	0.8
Sensitizing dye III-40	2.4×10^{-5}
Sensitizing dye III-6	1.9×10^{-4}
Sensitizing dye II-40	1.9×10^{-4}
Cyan coupler C-1	0.70
Colored cyan coupler	0.10
DIR compound D-1	0.01
DIR compound D-3	0.01
High-boiling solvent Oil-1	0.64
Gelatin	1.2

Layer 4: Medium-speed red-sensitive emulsion layer RM	
Silver iodobromide emulsion Em-2	0.7
Sensitizing dye III-40	$1.3x10^{-5}$
Sensitizing dye III-6	$1.0x10^{-4}$
Sensitizing dye II-40	$1.0x10^{-4}$
Cyan coupler C-1	0.28
Colored cyan coupler CC-1	0.05
DIR compound D-1	0.01
High-boiling solvent Oil-1	0.28
Gelatin	0.6

Layer 5: High-speed red-sensitive emulsion layer RH	
Silver iodobromide emulsion Em-3	0.9
Sensitizing dye III-40	$0.8x10^{-5}$
Sensitizing dye III-6	$0.6x10^{-4}$
Sensitizing dye II-40	$0.6x10^{-4}$
Cyan coupler C-1	0.03
Cyan coupler C-2	0.07
Colored cyan coupler CC-1	0.03
DIR compound D-1	0.04
High-boiling solvent Oil-1	0.17
Gelatin	1.2

Layer 6: Second intermediate layer IL-2

Gelatin	0.8

Layer 7: Low-speed green-sensitive emulsion layer GL	
Silver iodobromide emulsion Em-1	0.8
Sensitizing dye IV-14	$7.2x10^{-4}$
Sensitizing dye I-5	$8.0x10^{-5}$
Magenta coupler M-1	0.30
Magenta coupler M-2	0.19
Colored magenta coupler CM-1	0.10
DIR compound D-2	0.03
DIR compound D-4	0.007
High-boiling solvent Oil-2	0.62
Gelatin	1.3

Layer 8: Medium-speed green-sensitive emulsion layer GM	
Silver iodobromide emulsion Em-2	0.7
Sensitizing dye IV-14	3.6x10^{-4}
Sensitizing dye I-5	4.0x10^{-5}
Magenta coupler M-1	0.07
Magenta coupler M-2	0.04
Colored magenta coupler CM-1	0.04
DIR compound D-2	0.021
High-boiling solvent Oil-2	0.20
Gelatin	0.8

Layer 9: High-speed green-sensitive emulsion layer GH	
Silver iodobromide emulsion Em-3	0.9
Sensitizing dye IV-14	2.2x10^{-4}
Sensitizing dye I-5	2.4x10^{-5}
Magenta coupler M-2	0.04
Magenta coupler M-3	0.04
Colored magenta coupler CM-2	0.04
DIR compound D-2	0.012
High-boiling solvent Oil-2	0.15
Gelatin	0.9

Layer 10: Yellow filter layer YC	
Yellow colloidal silver	0.12
Antistain agent SC-1	0.1
High-boiling solvent Oil-2	0.13
Gelatin	0.8
Formalin scavenger HS-1	0.09
Formalin scavenger HS-2	0.07

Layer 11: Low-speed blue-sensitive emulsion layer BL	
Silver iodobromide emulsion Em-1	0.35
Silver iodobromide emulsion Em-2	0.15
Sensitising dye SD-1	6.1x10^{-4}
Yellow coupler Y-1	0.65
Yellow coupler Y-2	0.12
DIR compound D-1	0.05
High-boiling solvent Oil-2	0.16
Gelatin	1.1
Formalin scavenger HS-1	0.08

Layer 12: High-speed blue-sensitive emulsion layer BH	
Silver iodobromide emulsion Em-4	0.6
Sensitizing dye SD-1	1.8×10^{-4}
Yellow coupler Y-1	0.18
Yellow coupler Y-2	0.02
High-boiling solvent Oil-2	0.04
Gelatin	1.1
Formalin scavenger HS-1	0.05
Formalin scavenger HS-2	0.12

Layer 13: First protective layer Pro-1

Fine-grained silver iodobromide emulsion (average grain size: 0.08μm, AgI: 1 mol%)	0.2
UV absorbent UV-1	0.07
UV absorbent UV-2	0.10
High-boiling solvent Oil-1	0.06
High-boiling solvent Oil-3	0.06
Formalin scavenger HS-1	0.13
Formalin scavenger HS-2	0.37
Gelatin	1.1

Layer 14: Second protective layer Pro-2

Alkali-soluble matting agent (average particle size: 2μm)	0.07
Polymethyl methacrylate (average particle size: 3μm)	0.03
Lubricant WAX-1	0.04
Gelatin	0.6

The emulsions used in the above sample are as follows:

Em-1

Comprising monodispersed silver iodobromide grains (relative standard deviation of the silver iodide contents of the individual grains: 18%) having an average grain size of 0.35 μm, an average silver iodide content of 6.0 mol% and a core containing 35 mol% silver iodide.

Em-2

Comprising monodispersed silver iodobromide grains (relative standard deviation of the silver iodide contents of the individual grains: 19%) having an average grain size of 0.5 µm, an average silver iodide content of 6.8 mo%, and a core containing 35 mol% silver iodide.

Em-3

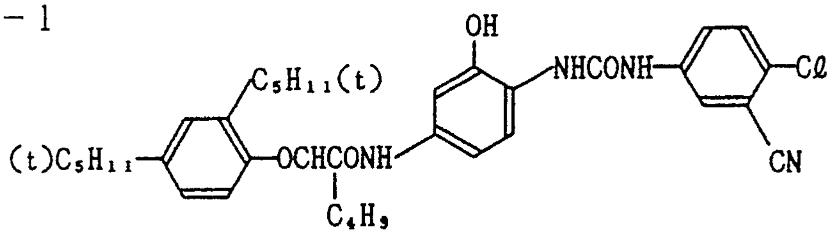
Comprising monodispersed silver iodobromide grains (relative standard deviation of the silver iodide contents of the individual grains: 18%) having an average grain size of 0.65 µm, an average silver iodide content of 8.0 mol% and a core containing 35 mol% silver iodide.

Em-4

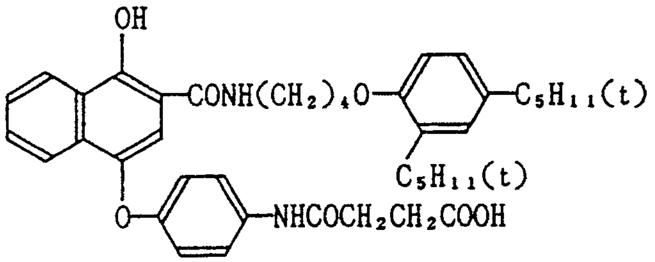
Comprising monodispersed silver iodide grains having twin planes at an aspect ratio of 3.5, an average grain size of 0.8 µm, and an average silver iodide content of 8.0 mol%.

The compounds used in the above sample are as follows:

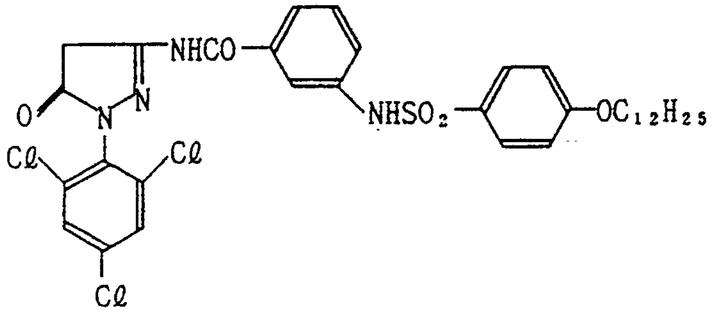
C－1



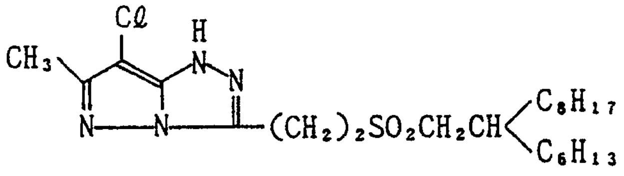
C－2



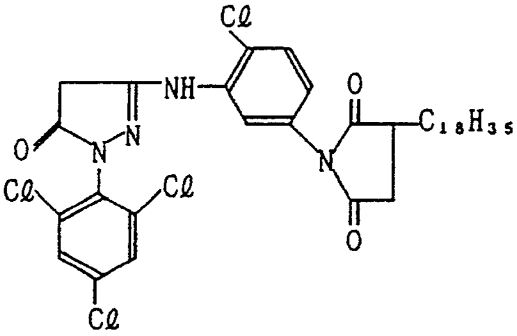
M－1



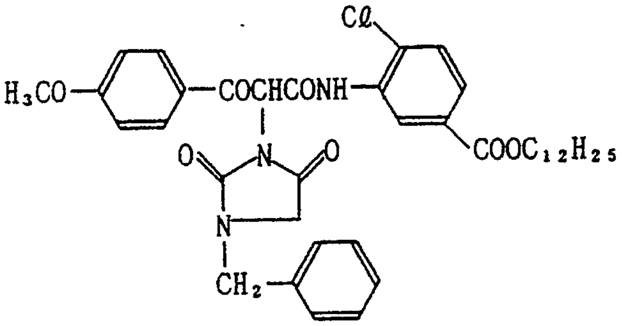
M－2



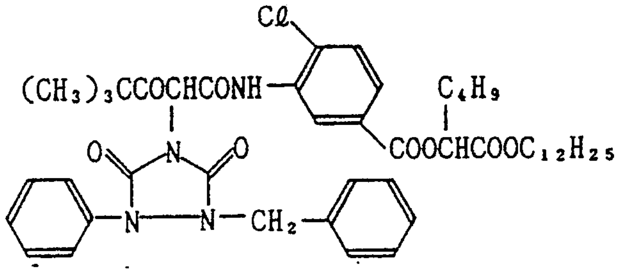
M－3



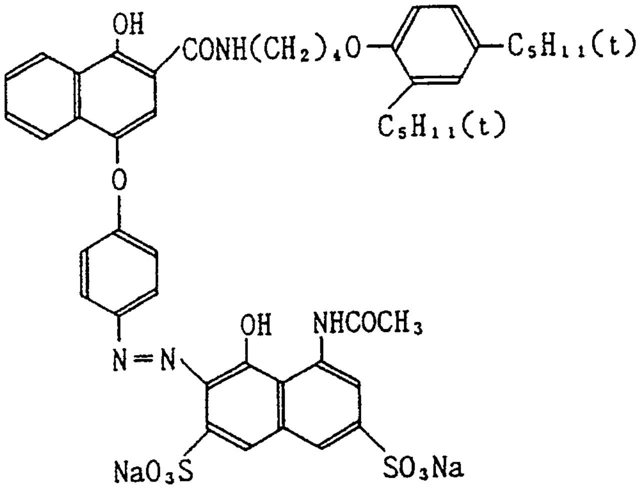
Y－1



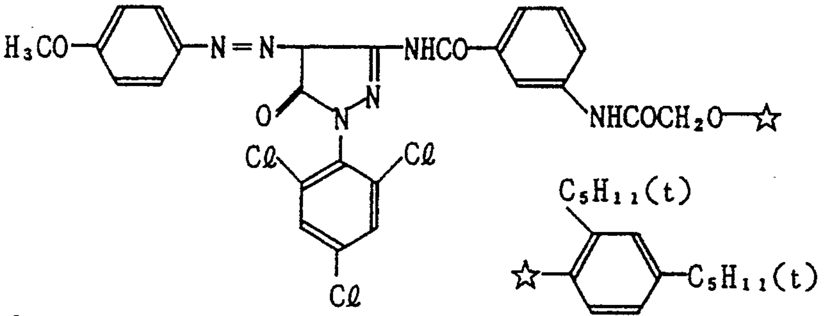
Y－2



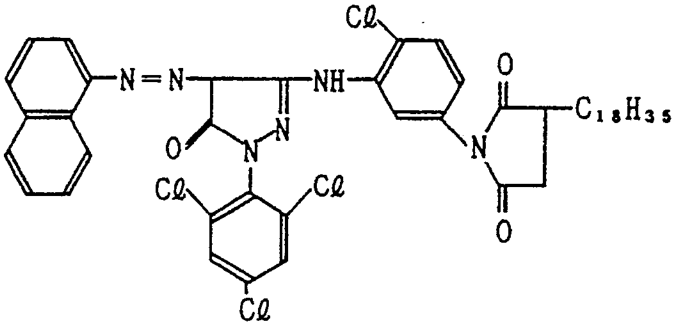
CC－1



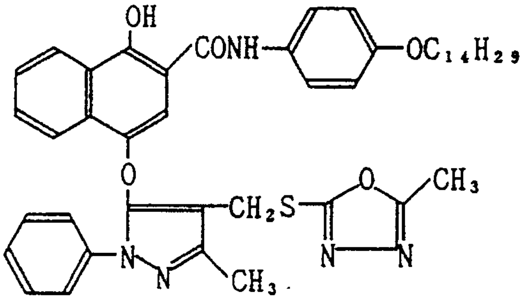
CM－1



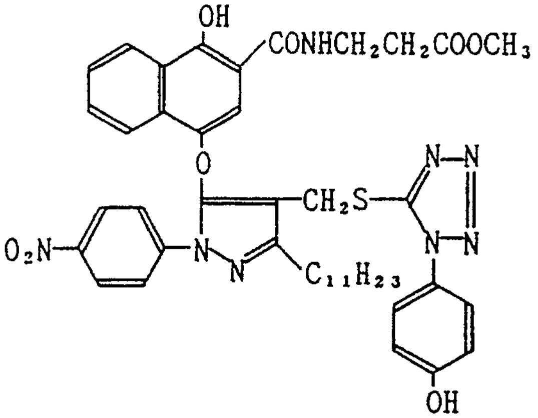
CM－2



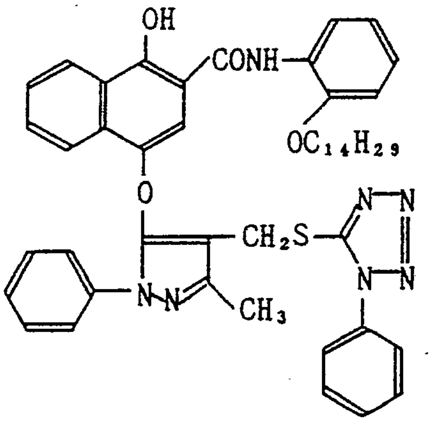
D－1



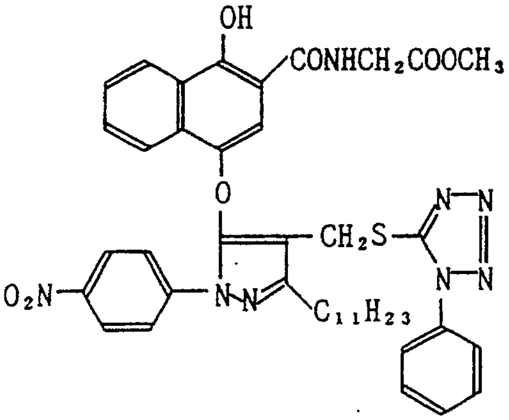
D－2



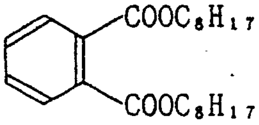
D－3



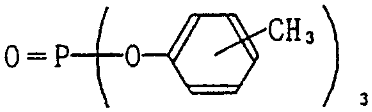
D－4



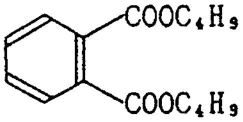
Oiℓ－1



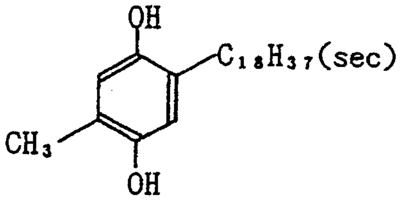
Oiℓ－2



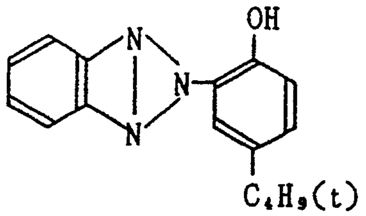
Oiℓ－3



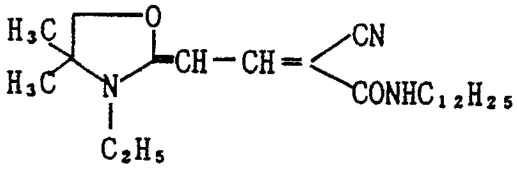
SC-1



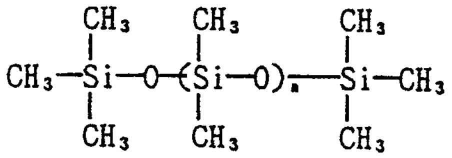
UV-1



UV-2



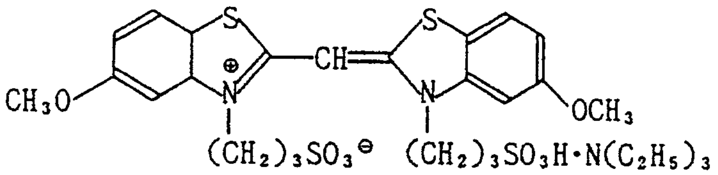
WAX-1



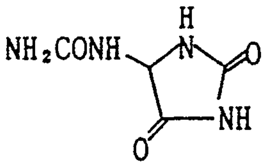
$$CH_3-\underset{CH_3}{\overset{CH_3}{Si}}-O-(\underset{CH_3}{\overset{CH_3}{Si}}-O)_n-\underset{CH_3}{\overset{CH_3}{Si}}-CH_3$$

Weight average molecular weight Mw = 3,000

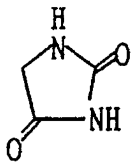
SD-1



HS-1



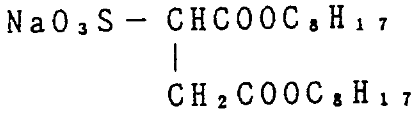
HS-2



In addition to the above compounds, a coating aid Su-1, a dispersing aid Su-2, a viscosity adjusting agent, hardeners H-1 and H-2, a stabilizer ST-1, and antifoggants AF-1 having a $\overline{Mw}$ of 10,000 and AF-2 having a $\overline{Mw}$ of 1,100,000 were added.

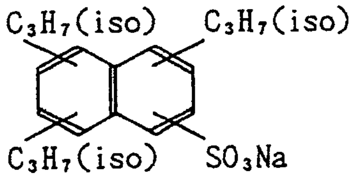
The additional compounds are as follows:

Su－1

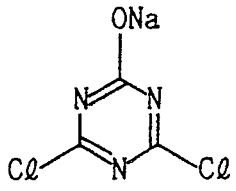


$$\begin{array}{ll} NaO_3S- & CHCOOC_8H_{17} \\ & | \\ & CH_2COOC_8H_{17} \end{array}$$

Su－2



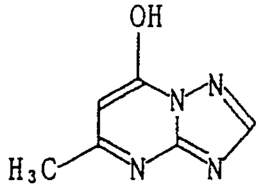
H－1



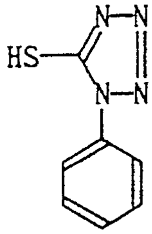
H－2

$(CH_2=CHSO_2CH_2)_2O$

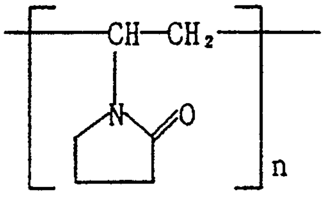
ST－1



AF－1



AF－2



n: Polymerization degree

The average grain size of each of the above emulsions is calculated in terms of a cube.

Each emulsion was optimally sensitized by gold-sulfur sensitization.

Subsequently, Samples 102 to 108 were prepared in the same manner as in Sample 101 except that the sensitizing dyes of Layers 3, 4, 5, 8, and 9 of Sample 101 were changed as shown in Table-1, and further the DIR compound of Layers 5 and 11 of Sample 101 was changed as shown in Table-1.

The total molar amount of the sensitizing dyes shown in Table-1 is all the same in each layer. Therefore, the difference between the samples is in the molar ratio of the sensitizing dyes in combination.

Each of Samples 101 to 108 thus prepared was subjected to spectral exposure in order to obtain the spectral sensitivity distribution thereof, and then processed in the following procedure Processing I. The processed sample was measured for the parameter to determine the spectral sensitivity distribution thereof based on the reciprocal of the exposure amount necessary to form a density of Dmin + 0.3.

The results are shown in Table 1.

Processing I:

Processing step (38° C)	
Color developing	3 min. 15 sec.
Bleaching	6 min. 30 sec.
Washing	3 min. 15 sec.
Fixing	6 min. 30 sec.
Washing	3 min. 15 sec.
Stabilizing	1 min. 30 sec.
Drying	

The compositions of the processing solutions used in the above processing steps are as follows:

Color developer

4-Amino-3-methyl-N-ethyl-N-(β-hydroxyethyl)-aniline sulfate	4.75g
Anhydrous sodium sulfite	4.25g
Hydroxylamine 1/2 sulfate	2.0 g
Anydrous potassium carbonate	37.5 g
Sodium bromide	1.3 g
Trisodium nitrilotriacetate, monohydrate	2.5 g
Potassium hydroxide	1.0 g
Water to make 1 liter (pH=10.1)	

Bleaching bath

Ferric-ammonium ethylenediaminetetraacetate	100.0 g
Diammonium ethylenediaminetetraacetate	10.0 g
Ammonium bromide	150.0 g

Glacial acetic acid	10 ml

Water to make 1 liter

Adjust pH to 6.0 with ammonia water.

<u>Fixing bath</u>

Ammonium thiosulfate	175.0 g
Anhydrous sodium sulfite	8.5 g
Sodium metasulfite	2.3 g

Water to make 1 liter

Adjust pH to 6.0 with acetic acid.

<u>Stabilizing bath</u>

Formalin (37% solution)	1.5 ml
Koniducks (product of KONICA Corp.)	7.5 ml

Water to make 1 liter.

Table 1

Sample No.	Sensitizing dyes of layers 3, 4, 5 (added amts mol ratio)		Sensitizing dyes of layers 8, 9 (added amts mol ratio)		DIR compound of layer 5 (g/m2)		DIR compound of layer 11 (g/m²)		λ_{Rmax} (nm)	S_{R610}/S_{Rmax} (%)	λ_{Gmax} (nm)	S_{G545}/S_{Gmax} (%)
101 (Comp.)	III-40 III-6 II-40	6 47 47	IV-14 I- 5	90 10	D-1	0.04	D-1	0.05	663	75	553	87
102 (Comp.)	III-6 I -5	60 40	IV-14 I- 5	90 10	D-1	0.04	D-1	0.05	628	82	553	87
103 (Comp.)	III-6 I -5	30 70	IV-14 I- 5	90 10	D-1	0.04	D-1	0.05	615	97	553	87
104 (Comp.)	III-6 I -5	30 70	IV-14 I- 5	80 20	D-1	0.04	D-1	0.05	615	97	556	76
105 (Inv.)	III-6 I -5	30 70	IV-14 I- 5	80 20	D-1	0.04	DIR-17	0.05	615	97	556	76
106 (Inv.)	III-6 I -5	30 70	IV-14 I- 5	80 20	D-1	0.03	DIR-39	0.06	615	97	556	76
107 (Inv.)	III-6 I -5	30 70	IV-14 I- 5	80 20	DIR-39	0.03	DIR-17	0.05	615	97	556	76
108 (Inv.)	III-6 I -5	30 70	IV-14 I- 5	80 20	D-1	0.03	DIR-17	0.06	615	97	553	87

The thus obtained samples were each divided into three parts and were subjected to the following Test-1 to Test 3.

Test-1:

Each light-sensitive material sample was divided into two parts; one was exposed through an optical wedge to an electronic flash and the other to a triwave fluorescent lamp light, and they were processed by the above-mentioned Processing I. From the separately exposed and processed samples their blue, green and red sensitivities each expressed by the logarithm of an exposure amount (Log E) necessary for forming a density of Dmin + 0.3 were found for comparison; the difference in the sensitivities due to the electronic flash (Log E^1) and the sensitivity point due to the triwave fluorescent light (Log E^2), ΔS_B, ΔS_G and ΔS_R, were found, and then the color reproducibility of each sample was judged by calculation from the equations:

$\Delta\Delta S_G = \Delta S_G - \Delta S_R$
$\Delta\Delta S_R = \Delta S_R - \Delta S_B$

The closer the values of $\Delta\Delta S_G$ and $\Delta\Delta S_R$ are to zero, the closer the color balance of the exposed image to the fluorescent light is to that to the electronic flash light, which is a good parameter to know the color inbalance of an actural print.

Test-2:

Each light-sensitive material sample was used to practically photograph a Macbeth Color Checker and a portrait by separate lightings with an electronic flash light and a triwave fluorescent light, and a print from the sample in the case of the fluorescent lamp lighting was made under the same printing condition as that for giving the same gray as the gray of the color checker to a print of the sample in the electronic flash lighting, and the difference in the color reproduction between both prints was judged visually.

Test-3:

Each light-sensitive material sample was partly imagewise exposed by using a camera KONICA FS-1 (manufactured by KONICA Corp.), the remaining part of the sample was exposed through a step wedge to a white light, and then subjected to continuous processing in an automatic processor according to the following processing steps Processing II for evaluating the processing compatibility of the samples. The running processing was lasted until the time when the amount of stabilizer replenisher comes to three times the stabilizer tank capacity.

Processing II

Processing step	Time	Temp.	Replenished amt.
Color developing	3 min. 15 sec.	38°C	540 ml
Bleaching	45 sec.	38°C	155 ml
Fixing	1 min. 45 sec.	38°C	500 ml
Stabilizing	90 sec.	38°C	775 ml
Drying	1 min.	40 - 70°C	--

Note: The above replenished amount is per m^2 of the sample.

The above stabilization processing was carried out in a three-bath counter-current system, in which the replenishment was made to the final bath from which the stabilizer solution is overflowed to the preceding bath.

The compositions of the processing solutions used in the above are as follows:

Color developer

Potassium carbonate	30 g
Sodium hydrogencarbonate	2.7 g
Potassium sulfite	2.8 g
Sodium bromide	1.3 g
Hydroxylamine sulfate	3.2 g
Sodium chloride	0.6 g
4-Amino-3-methyl-N-ethyl-N-(β-hydroxylethyl)-aniline sulfate	4.6 g
Diethylenetriaminepentaacetic acid	3.0 g
Potassium hydroxide	1.3 g

Water to make 1 liter

Adjust pH to 10.01 with potassium hydroxide or 20% sulfuric acid.

Color developer replenisher

Potassium carbonate	40 g
Sodium hydrogencarbonate	3 g
Potassium sulfite	7 g

Sodium bromide	0.5 g
Hydroxylamine sulfate	3.2 g
4-Amino-3-methyl-N-ethyl-N-(β-hydroxylethyl)-aniline sulfate	6.0 g
Diethylenetriaminepentaacetic acid	3.0 g
Potassium hydroxide	2 g
Water to make 1 liter	

Adjust pH to 10.12 with potassium hydroxide or 20% sulfuric acid.

Bleaching bath

Ferric-ammonium 1,3-diaminopropanetetraacetate	0.35 mol
Disodium ethylenediaminetatraacetate	2 g
Ammonium bromide	150 g
Glacial acetic acid	40 ml
Ammonium nitrate	40 g
Water to make 1 liter	

Adjust pH to 4.5 with ammonia water or glacial acetic acid.

Bleacher replenisher

Ferric-ammonium 1,3-diaminopropanetetraacetate	0.40 mol
Disodium ethylenediaminetetraacetate	2 g
Ammonium bromide	170 g
Ammonium nitrate	50 g
Glacial acetic acid	61 ml
Water to make 1 liter	

Adjust pH to 3.5 with ammonia water or glacial acetic acid.

Maintain the pH of the bleacher tank solution in a discretional way.

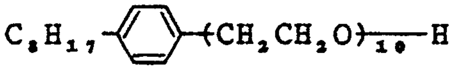
Fixer bath, fixer replenisher

Ammonium thiosulfate	100 g
Ammonium thiocyanate	150 g
Anhydrous sodium bisulfite	20 g
Sodium metabisulfite	4.0g
Disodium ethylenediaminetetraacetate	1.0g

Water to make 700 ml.

Adjust pH to 6.5 with glacial acetic acid or ammonia water.

Stabilizer bath, stabilizer replenisher

1,2-benzimidazoline-3-one	0.1g
 (50% aqueous solution)	2.0 ml
Hexamethylenetetramine	0.2g
Hexahydro-1,3,5-tris(2-hydroxyethyl)-5-triazine	0.3g

Water to make 1 liter

Adjust pH to 7.0 with potassium hydroxide or 50% sulfuric acid.

The maximum absolute gamma difference (| $\Delta\gamma$ |) between the γ of a sample processed by the foregoing Processing I and the γ of the same sample processed by the above Processing II was regarded as the representative characteristic of the processing compatibility. The transmission densities of the samples were measured with a KONICA optical densitometer PDA-65, manufactured by KONICA Corporation.

The results obtained in the above exposure tests 1 to 3 are shown in Table 2.

Table 2

Sample No.	Gray balance in fluorescent light		Color characteristic of print photographed in fluorescent light	Characteristics of bluish green and green colors of print photographed in electronid flash light	Gamma difference (| Δγ |)		
	ΔAS_R	ΔAS_G			B	G	R
101 (Comp.)	-0.20	+0.12	Skin color looks strongly tinged with bluish green.	Bluish green color is close to cyan. Green color also looks strongly cyanish.	0.16	0.16	0.15
102 (Comp.)	-0.12	+0.12	Skin color looks lifeless, tinged with bluish green.	Both bluish green and green colors are shifted toward the cyan color side.	0.16	0.15	0.15
103 (Comp.)	-0.02	+0.12	Skin color looks lifeless, tinged with green.	Bluish green color is somewhat closer to the original color, but green color is less yellowish, tending toward bluish green.	0.14	0.14	0.14
104 (Comp.)	-0.02	+0.05	Natural skin color, nearly the same as in print photographed in electronic flash light.	Both bluish green and green colors are closer to the original's, but still on an unsatisfactory level.	0.14	0.13	0.13
105 (Inv.)	-0.02	+0.01	Natural skin color	Bluish green and green colors are almost the same as the original's. Slightly insufficient color saturation.	0.06	0.05	0.04
106 (Inv.)	-0.02	+0.05	Natural skin color	Both colors are considerably close to the original's. Green color has a high color saturation.	0.05	0.05	0.04
107 (Inv.)	-0.02	+0.05	Natural skin color	Both colors closely resemble the originals's.	0.05	0.05	0.04
108 (Comp.)	-0.02	+0.12	Skin color looks lifeless, greenish.	Both colors closely resemble the original's.	0.08	0.06	0.06

As is apparent from Table 2, the samples of the invention, even when applied to photographing in the fluorescent lamp light, provide truer color reproductions, particularly more satisfactory bluish green and green color reproductions, and even when subjected to a continuous low-replenishing-type processing, can provide more stable photographic characteristics than the comparative samples.

Claims

1. A silver halide color photograpic light-sensitive material comprising a support having thereon a blue-sensitive silver hlaide emulsion layer, a green-sensitive silver halide emulsion layer and a red-sensitive silver halide emulsion layer, wherein the maximum sensitive wavelength of said red-sensitive silver halide emulsion layer λ_{Rmax}, the sensitivity of said red-sensitive emulsion layer to light of wavelength of λ_{Rmax}, S_{Rmax}, the sensitivity of said red-sensitive emulsion layer to light of wavelength of 610nm, S_{R610}, the maximum sensitive wavelength of said green-sensitive silver halide emulsion layer λ_{Gmax}, the sensitivity of said green-sensitive emulsion layer to light of wavelength of λ_{Gmax}, S_{Gmax}, and the sensitivity of said green-sensitive emulsion layer to light of wavelength of 545nm, S_{G545}, satisfy the following requirements, provided that said S_{R610}, S_{Rmax}, S_{G545} and S_{Gmax} are each determined based on a reciprocal of a ligh amount necessary for forming the optical density of 0.3 on the minimum density of said light-sensitive material after processing,

   $590\text{nm} \leqq \lambda_{Rmax} \leqq 625\text{nm}$; $S_{R610} \geqq 0.8\ S_{Rmax}$,
   $520\text{nm} \leqq \lambda_{Gmax} \leqq 570\text{nm}$; $S_{G545} \leqq 0.8\ S_{Gmax}$,

   and at least one of layers included in said silver hlaide color photographic light-sensitive material contains a development inhibitor releasing compound having a fragment of development inhibitor or a fragment of development inhibitor precurser, each of which is capable of splitting off from said coupling site upon coupling reaction with the oxidation product of a color developing agent to form a developing inhibitor and said developing inhibitor loses development inhibiting ability thereof at a rate of a half-life of not more than 4 hours in a color developer.

2. The material of claim 1, wherein the relation between S_{R510} to S_{Rmax} is $S_{R510} \geqq 0.9\ S_{Rmax}$.

3. The material of claim 1, whererin of said development inhibitor releasing coupler is represented by the following

   Formula I

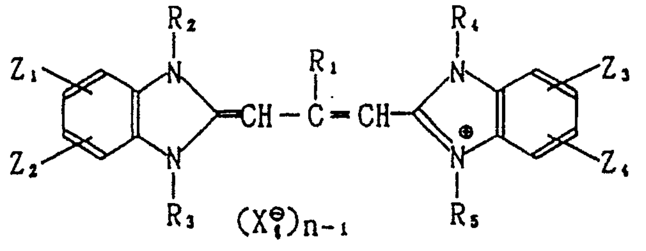
   $$\text{Cp}\!-\!(\text{T})_m\!-\!\text{Z}\!-\!(\text{L}\!-\!\text{Y})_n \qquad (1)$$

   wherein Cp is a coupler moiety; Z is a moiety of a development inhibitor being bonded directly or through a linkage group T to the coupling site of said coupler moiety; Y is a group capable of splitting off from said moiety of Z in said developer so as to make inactive the moiety Z as development inhibitor; m is an integer of 0 or 1 and n is an integer of 1 or 2.

4. The material of claim 1, wherein the half-life of the development inhibitor is not more than 2 hours.

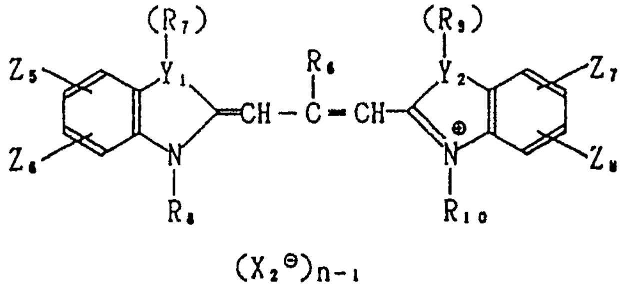
5. The material of claim 4, wherein the half-life of the development inhibitor is not more than 1 hours.

6. The material of claim 1, wherein said red-sensitive silver halide emulsion layer contains a sensitizind dye represented by the following Formula I and a sensitizing dye represented by the following Formula II:



(I)

   wherein R_1 is a hydrogen atom, an alkyl group or an aryl group; R_2, R_3, R_4 and R_5 are independently an alkyl group or an aryl group; Z_1, Z_2, Z_3 and Z_4 are independently a hydrogen atom, a halogen atom, a hydroxyl group, an alkoxy group, an amino grop, an acyl group, an acylamino group, an acyloxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxycarbonylamino group, a carbamoyl group, an aryl group, an alkyl group, a cyano group or a sulfonyl group, Z_1 and Z_2 or Z_3 and Z_4 are allowed to bond to form a ring; $X_1^{\ominus}$ is an anion; and n is an integer of 1 or 2, provided that n is 1 when the dye forms an intramolecular salt,



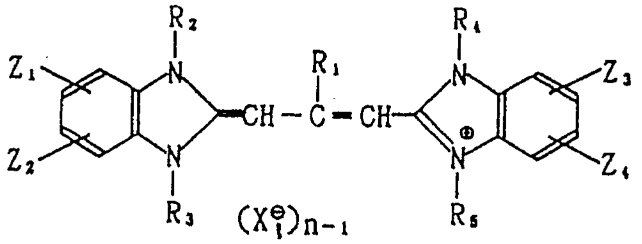
(II)

wherein R_6 is a hydrogen atom, an alkyl group or an aryl group; R_7, R_8, R_9 and R_{10} each are independently an alkyl group or an aryl group; Y_1 and Y_2 each are independently a nitrogen atom, an oxygen atom, a sulfur atom or a selenium atom, provided that the group represented by R_7 does not exist when Y_1 is a sulfur atom, an oxygen atom or a selenium atom and atoms represented by Y_1 and Y_2 are not nitrogen atoms or sulfur atoms at the same time; Z_5, Z_6, Z_7 and Z_8 each are independently a hydrogen atom, a halogen atom, a hydroxyl group, an alkoxy group, an amino grop, an acyl group, an acylamino group, an acyloxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxycarbonylamino group, a carbamoyl group, an aryl group, an alkyl group, a cyano group or a sulfonyl group, Z_5 and Z_6 or Z_7 and Z_8 are allowed to bond to form a ring; $X_2^{\ominus}$ is an anlon; and n is an integer of 1 or 2, provided that n is 1 when the dye forms an intramolecular salt.

7. A silver halide color photograpic light-sensitive material comprising a support having thereon a blue-sensitive silver hlaide emulsion layer, a green-sensitive silver halide emulsion layer and a red-sensitive silver halide emulsion layer, wherein said red-sensitive silver halide emulsion layer contains a sensitizing dye represented by the following Formula I and a sensitizing dyerepresented by the following Formula II and the maximum sensitive wavelength of said red-sensitive silver halide emulsion layer λ_{Rmax}, the sensitivity of said red-sensitive emulsion layer to light of wavelength of λ_{Rmax}, S_{Rmax}, the sensitivity of said red-sensitive emulsion layer to light of wavelength of 610nm, S_{R610}, the maximum sensitive wavelength of said green-sensitive silver halide emulsion layer λ_{Gmax}, the sensitivity of said green-sensitive emulsion layer to light of wavelength of λ_{Gmax}, S_{Gmax}, and the sensitivity of said green-sensitive emulsion layer to light of wavelength of 545nm, S_{G545}, satisfy the following requirements, provided that said S_{R610}, S_{Rmax}, S_{G545} and S_{Gmax} are each determined based on a reciprocal of a ligh amount necessary for forming the optical density of 0.3 on the minimum density of said light-sensitive material after processing,

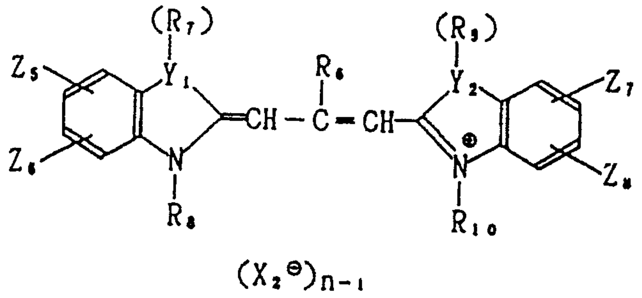
$$590\text{nm} \leqq \lambda_{Rmax} \leqq 625\text{nm}\ ;\ S_{R610} \geqq 0.8\ S_{Rmax},$$
$$520\text{nm} \leqq \lambda_{Gmax} \leqq 570\text{nm}\ ;\ S_{G545} \leqq 0.8\ S_{Gmax},$$

and at least one of layers included in said silver hlaide color photographic light-sensitive material contains a development inhibitor releasing compound represented by the following Formula V which has a fragment of development inhibitor or a fragment of development inhibitor precurser, each of which is capable of splitting off from said coupling site upon coupling reaction with the oxidation product of a color developing agent to form a developing inhibitor and said developing inhibitor loses development inhibiting ability thereof at a rate of a half-life of not more than 1 hours in a color developer,



(I)

wherein R_1 is a hydrogen atom, an alkyl group or an aryl group; R_2, R_3, R_4 and R_5 are independently an alkyl group or an aryl group; Z_1, Z_2, Z_3 and Z_4 are independently a hydrogen atom, a halogen atom, a hydroxyl group, an alkoxy group, an amino grop, an acyl group, an acylamino group, an acyloxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxycarbonylamino group, a carbamoyl group, an aryl group, an alkyl group, a cyano group or a sulfonyl group, Z_1 and Z_2 or Z_3 and Z_4 are allowed to bond to form a ring; $X_1^{\ominus}$ is an anion; and n is an integer of 1 or 2, provided that n is 1 when the dye forms an intramolecular salt,



(II)

wherein R_6 is a hydrogen atom, an alkyl group or an aryl group; R_7, R_8, R_9 and R_{10} each are independently an alkyl group or an aryl group; Y_1 and Y_2 each are independently a nitrogen atom, an oxygen atom, a sulfur atom or a selenium atom, provided that the group represented by R_7 does not exist when Y_1 is a sulfur atom, an oxygen atom or a selenium atom and atoms represented by Y_1 and Y_2 are not nitrogen atoms or sulfur atoms at the same time; Z_5, Z_6, Z_7 and Z_8 each are independently a hydrogen atom, a halogen atom, a hydroxyl group, an alkoxy group, an amino grop, an acyl group, an acylamino group, an acyloxy group, an aryloxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkoxycarbonylamino group, a carbamoyl group, an aryl group, an alkyl group, a cyano group or a sulfonyl group, Z_5 and Z_6 or Z_7 and Z_8 are allowed to bond to form a ring; $X_2^{\ominus}$ is an anion; and n is an integer of 1 or 2, provided that n is 1 when the dye forms an intramolecular salt,

$$Cp{-}(T)_m{-}Z{-}(L{-}Y)_n \qquad \text{(V)}$$

wherein Cp is a coupler moiety; Z is a moiety of a development inhibitor being bonded directly or through a linkage group T to the coupling site of said coupler moiety; Y is a group capable of splitting off from said moiety of Z in said developer so as to make inactive the moiety Z as development inhibitor; m is an integer of 0 or 1 and n is an integer of 1 or 2.

European
Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 10 8320

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	JP-A-6 216 044 (FUJI) * the whole document * – – –	1-7	G 03 C 7/30
Y,D	DE-A-3 209 486 (FUJI) * page 57 *compound (21) * – – – – –	1-7	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

G 03 C

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	03 September 91	MAGRIZOS S.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same catagory
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention

E: earlier patent document, but published on, or after the filing date
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