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(54) **Record material**

Aufzeichnungsmaterial

Matériel d'enregistrement

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(73) Proprietor: **APPLETON PAPERS INC.**
Appleton Wisconsin 54912 (US)

(72) Inventors:
- **Glanz, Kenneth Donald**
  Appleton, Wisconsin 54914 (US)
- **Dwyer-Hallquist, Patricia**
  Oshkosh, Wisconsin 54901 (US)

(74) Representative: **Norris, Richard John**
Intellectual Property Department,
Arjo Wiggins Appleton plc,
Butler's Court,
Wattleton Road
Beaconsfield, Buckinghamshire HP9 1RT (GB)

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EP-A- 0 226 362 **US-A- 3 560 229**
US-A- 4 688 058

- **PATENT ABSTRACTS OF JAPAN vol. 12, no. 142 (M-692)(2989) 30 April 1988**
- **PATENT ABSTRACTS OF JAPAN vol. 9, no. 333 (M-443)(2056) 27 December 1985**
- **PATENT ABSTRACTS OF JAPAN vol. 14, no. 69 (M-932)(4012) 8 February 1990**
- **PATENT ABSTRACTS OF JAPAN vol. 8, no. 191 (M-322)(1628) 4 September 1984**

Remarks:

The file contains technical information submitted after the application was filed and not included in this specification

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EP 0 497 465 B1

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Description

This invention relates to record material of the kind in which dark-colored marks can be developed upon reactive contact with one or more colorless basic chromogenic materials (also called color formers). The invention finds particular application in thermally-responsive record material and systems, and in pressure-sensitive record material and systems (also called carbonless copying paper).

Thermally-responsive record material typically consists of one or more substrate sheets, reels or rolls coated with color-forming materials comprising chromogenic material and acidic color developer material.

Thermally-responsive record material systems are well known in the art, and are described in many patents, for example U.S. Patent Nos. 3,539,375; 3,674,535; 3,746,675; 4,151,748; 4,181,771; 4,246,318; and 4,470,057; to which reference can be made for additional information as desired. In these systems, basic chromogenic material and acidic color developer material are contained in one or more coatings on a substrate which, when heated to a suitable temperature, melt, soften or sublime to permit said materials to react, thereby producing a colored mark by such reactive contact. Such systems have characteristic thermal responses, producing a color image of sufficient intensity upon selective thermal exposure.

Pressure-sensitive carbonless copy paper of the transfer type typically consists of multiple cooperating superimposed plies in the form of sheets of paper which have coated, on one surface of one such ply, pressure-rupturable microcapsules containing a solution of one or more color formers (hereinafter referred to as a CB sheet) for transfer to a second ply carrying a coating comprising one or more color developers (hereinafter referred to as a CF sheet). To the uncoated side of the CF sheet can also be applied pressure-rupturable microcapsules containing a solution of color formers resulting in a pressure-sensitive sheet which is coated on both the front and back sides (hereinafter referred to as a CFB sheet). When said plies are superimposed, one on the other, in such manner that the microcapsules of one ply are in proximity with the color developers of the second ply, the application of pressure, as by typewriter or printer, sufficient to rupture the microcapsules, releases the solution to the CF sheet resulting in image formation through reaction of the color former with the color developer. Such transfer systems and their preparation are disclosed in U.S. Patent No. 2,730,456.

The record material of the present invention utilises a phenol derivative as a color developer material.

Certain biphenol compounds have previously been suggested as developer materials including 2,2-bis(4-hydroxyphenyl)-5-methylhexane (U.S. Patent No. 4,551,739). Other various biphenol compounds are taught in U.S. Patent No. 3,244,550 including 2,2'-methylene-bis(4-tert-pentylphenol); 4,4'-sec-butylidenediphenol, and 4,4'-isopropylidenediphenol.

U.S. Patent No. 4,880,766 describes a series of known and new developer compositions including addition products of a phenol and a diolefinic alkylated or alkenylated cyclic hydrocarbon; a zinc modified addition product of a phenol and a diolefinic alkylated or alkenylated cyclic hydrocarbon; mixtures of an acidic polymer and an organic carboxylic acid or metal salt thereof; polyvalent metalized carboxy-denatured terpentine phenol resins; and mixtures containing a certain weight percent phenolic group, divalent zinc and an aromatic carboxylate component.

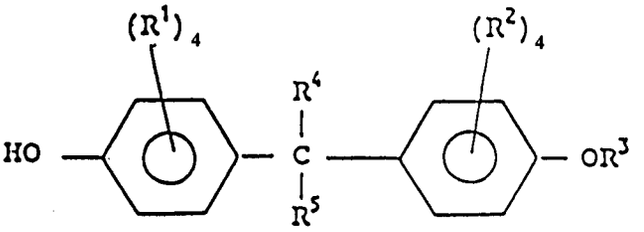
JP-A-62263086 discloses a thermal recording paper comprising a chromogenic material, a color developer and a Bisphenol A or Bisphenol S acryloyl, methacryloyl or alkyl derivative of a specified general formula. Of the Bisphenol A derivatives, only acryloyl and methacryloyl derivatives are individualized.

US-A-4688058 discloses a thermal recording material comprising a chromogenic material, a color developer of specified general formula and a sensitizer of specified general formula. The general formula of the color developer includes alkoxy derivatives of Bisphenol A, but no such derivatives are individualized.

JP-A-60165290 discloses a thermal recording sheet comprising a chromogenic material and, as a color developer, a generally-defined aralkyloxy derivative of Bisphenol A. Within this general class of color developers, 2-(4-hydroxyphenyl)-2-(4-phenethyloxyphenyl) propane and 2-(4-hydroxyphenyl)-2-(4-benzyloxyphenyl) propane are individualized.

The present invention seeks to provide record materials which give improved thermal response, or faster or more intense imaging.

According to the invention, there is provided a record material comprising a substrate and a color developer material, characterized in that the color developer material comprises a substituted phenol of the formula



wherein:

each of R^1 and R^2 is independently hydrogen, C_1-C_8 alkyl, or halogen;
R^3 is allyl, benzyl or C_1-C_4 alkyl, preferably methyl; and
either each of R^4 and R^5 is independently hydrogen or C_1-C_8 alkyl, or R^4 and R^5 together form a 5 or 6 membered alkyl ring;

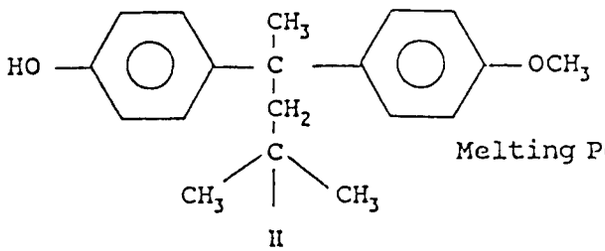
with the proviso that when R^4 and R^5 are both methyl and R^1 and R^2 are both hydrogen, R^3 is not benzyl.

It is preferred that R^4 and R^5 are not hydrogen simultaneously. It is preferred that R^1 and R^2 are each independently hydrogen or halogen. Of the halogens for R^1 or R^2, chlorine and bromine are more preferred. Up to two chlorines or bromines on each phenyl, or hydrogen substitution, thereof is preferred. The methoxyphenylalkylphenols are preferred.

Particularly preferred color developer materials within the above general formula and preferences are those which in which each of R^1 and R^2 is independently hydrogen or halogen and R^3 is C_1-C_4 alkyl, preferably methyl.

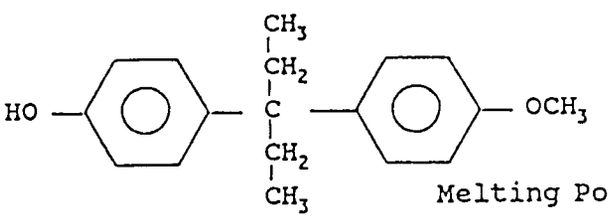
These compounds include by way of illustration:

1. Phenol, 4-[1-(4-methoxyphenyl)-1,3-dimethylbutyl]-



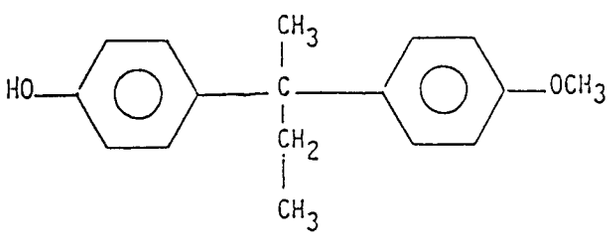
Melting Point 119°-122°C

2. Phenol, 4-[1-ethyl-1-(4-methoxyphenyl)propyl]-



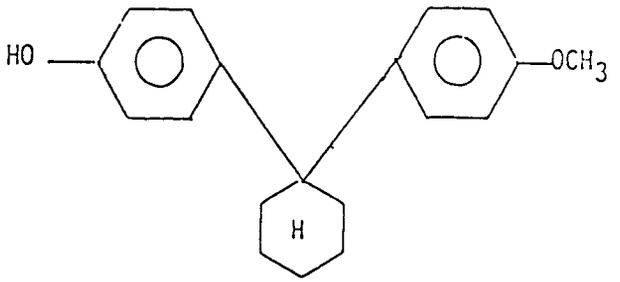
Melting Point 124°-126°C

3. Phenol, 4-[1-(4-methoxyphenyl)-1-methylpropyl]-



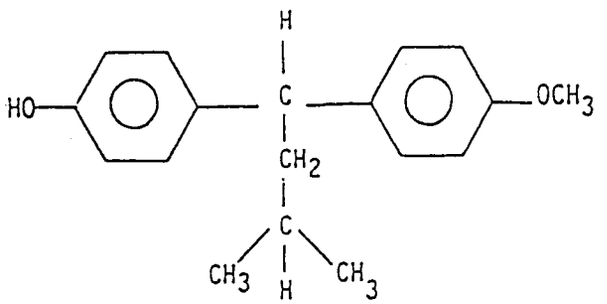
Melting Point 112°-113°C

4. Phenol, 4-[1-(4-methoxyphenyl)cyclohexyl]-



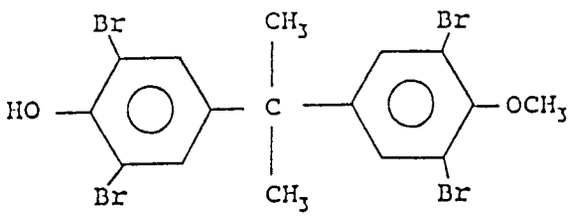
Melting Point 115°-117°C

5. Phenol, 4-[1-(4-methoxyphenyl)-3-methylbutyl]-



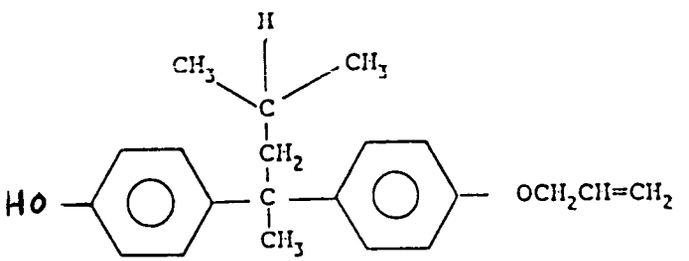
Melting Point 79°-80°C

6. Phenol, 4-[1-(3,5-Dibromo-4-methoxyphenyl)-1-methylethyl]-2,6-Dibromo-



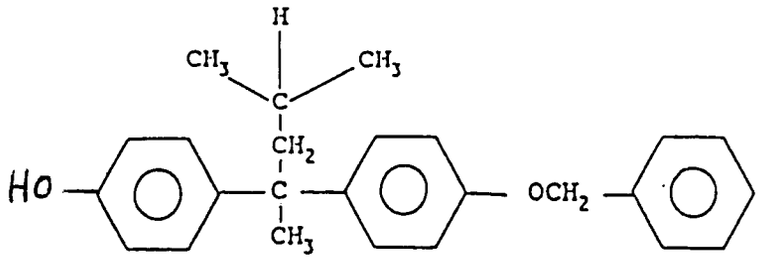
Melting Point 133°-134°C

7. Phenol, 4-[1-(4-allyloxyphenyl)-1,3-dimethylbutyl]-



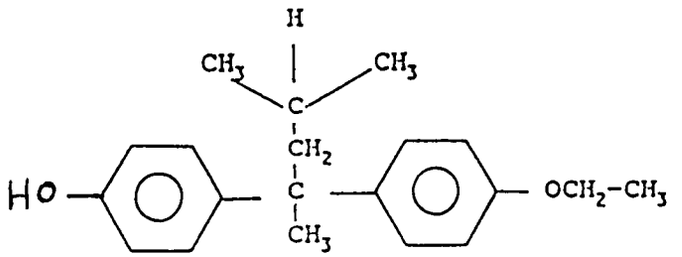
viscous liquid

8. Phenol, 4-[1-(4-benzyloxyphenyl)-1,3-dimethylbutyl]-



viscous liquid

9. Phenol, 4-[1-(4-ethoxyphenyl)-1,3-dimethylbutyl]-



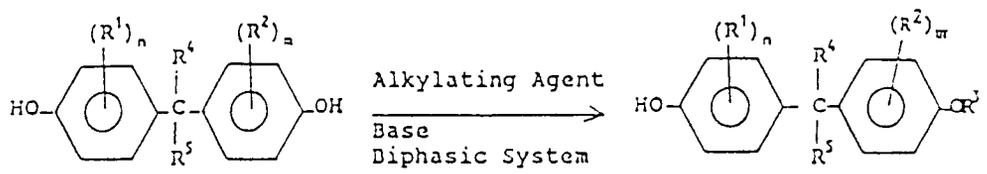
viscous liquid

These developers of the invention are typically coated on a substrate to provide either a conventional CF for pressure sensitive record materials, or coated on a substrate together with a chromogenic compound to yield a thermally sensitive record material having improved thermal response, or faster or more intense imaging. In addition to methoxyphenylalkylphenols, other alkoxyphenylalkylphenols are useful. The methoxy group can be optionally replaced with ethoxy, propoxy, isopropoxy, isobutoxy, tertbutoxy, sec-butoxy, i.e. the alkoxy group can be from one to four carbons with methoxy being preferred.

These compounds include materials such as 4-[1-(4-ethoxyphenyl)-1,3-dimethylbutyl] phenol; 4-[1-ethyl-1-(4-ethoxyphenyl)propyl]phenol; 4-[1-(4-ethoxyphenyl)-1-methylpropyl]phenol: 4-[1-(4-ethoxyphenyl)cyclohexyl]phenol; 4-[1-(4-ethoxyphenyl)-3-methylbutyl]phenol; 4-[1-(3,5-dibromo-4-ethoxyphenyl)-1-methylethyl]2,6-dibromophenol; 4-[1-(4-isobutoxyphenyl)-1,3-dimethylbutyl]phenol, 4-[1-(4-propoxyphenyl)-1,3-dimethylbutyl] phenol; ; 4-[1-ethyl-1-(4-propoxyphenyl)propyl]phenol; 4-[1-(4-propoxyphenyl)-1-methylpropyl]phenol;4-[1-(4-isopropoxyphenyl)cyclohexyl]phenol; 4-[1-(4-tertbutoxyphenyl)-3-methylbutyl]phenol; 4-[1-(3,5-dibromo-4-butoxyphenyl)-1-methylethyl]-2,6-dibromo phenol; 4-[1-(4-tertbutoxyphenyl)-1,3-dimethylbutyl]phenol; 4-[1-ethyl-1-(4-isopropoxyphenyl)propyl]phenol and the like.

Where the resulting materials are viscous oils at room temperature, chlorination or bromination at R^1 or R^2 increases molecular weight and helps provide solid materials. The oils can be used when ground together with clays or other carriers. The methoxy versions are typically solids at room temperature and preferred in thermal record materials.

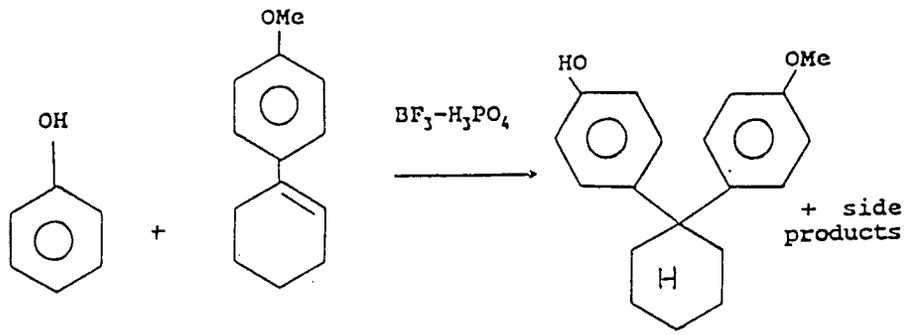
Substituted phenols and alkoxyphenylalkylphenols for use in the invention are preparable as follows:



Bisphenols, also called biphenols, can be selectively monalkylated by treatment with an alkylating agent in a bipha-

sic system. The biphasic systems can consist of aqueous alkali and a water-immiscible solvent such as CH_2Cl_2 or ethyl ether. The product is removed from further reaction by extraction into the solvent. Another method of synthesis is to treat the bisphenol with an alkylating agent in aqueous alkali; the product precipitates out of the aqueous alkali. These processes appear to yield better results than treatment with alkylating agent in a single organic solvent in which the monoalkylated product is soluble.

4-[1-(4-alkoxyphenyl)cyclohexyl]phenol can be illustrated with 4-[1-(4-methoxyphenyl)cyclohexyl]phenol, which can be prepared by a condensation reaction.



Chemical Abstract (CA 85(19):142743y) describes this synthesis in more detail. Example 29 also describes synthesis of this type compound.

Record systems using the alkoxyphenylalkylphenol developers of the invention have been found to have surprisingly improved image formation characteristics such as improved thermal response or faster image formation or more intense images in the record systems. In thermal records systems a record system with an improved thermal response, desirably produces an image upon application of a lower amount of energy making the system useful in facsimile equipment described as of higher sensitivity.

Compounds with other substitution patterns are also useful. The desired melting point of compounds of this type for thermal systems would be in a range of 60° to 150°C.

Thermally-sensitive mark-forming systems are well known in the art and are described in many patents, for example U.S. Patent Nos. 3,539,375; 3,674,535; 3,746,675; 4,151,748; 4,181,771 and 4,245,318. In these systems basic chromogenic material and acidic color developer material are contained in a coating or coatings on a substrate which, when heated to a suitable temperature, melts or softens to permit said materials to react, thereby producing a colored mark.

The record material according to this invention includes a substrate or support material which is generally in sheet form. For purposes of this invention, sheets can be referred to as support members and are understood to also mean webs, ribbons, tapes, belts, films, cards and the like. Sheets denote articles having two large surface dimensions and a comparatively small thickness dimension. Paper is preferred. The substrate or support material can be opaque, transparent or translucent and could, itself, be colored or not. It can be a film including, for example, cellophane and synthetic polymeric sheets cast, extruded, or otherwise formed.

The compounds of the invention are more preferably and most advantageously utilized in thermally-responsive systems. In thermal systems, the components of the color-forming system (colorformer and developer of the invention) are in a substantially contiguous relationship and substantially homogeneously distributed throughout the active coated layer material deposited on the substrate. In manufacturing the thermal record material, a coating composition is prepared which includes a fine dispersion of the components of the color-forming system, polymeric binder material, surface active agents and other additives in an aqueous coating medium. The composition can additionally contain inert pigments in the same or additional layers, such as clay, talc, aluminum hydroxide, calcined kaolin clay and calcium carbonate; synthetic pigments, such as urea-formaldehyde resin pigments; natural waxes such as Carnauba wax, synthetic waxes; lubricants such as zinc stearate; wetting agents; defoamers, sensitizers and antioxidants. Sensitizers, for example, can include acetoacet-o-toluidine, phenyl-1-hydroxy-2-naphthoate, 1,2-diphenoxyethane, and p-benzylbiphenyl. These materials can be applied in one or more layers. The various components can be in the same layer or separated by placing various components in different layers. The chromogenic material, for example, can be placed throughout an overcoat layer. The developer or sensitizers can be placed throughout a separate layer or layers, such as an underlayer. Preferred is one active layer with chromogen, developer and sensitizers.

The color-forming system components are substantially insoluble in the dispersion vehicle (preferably water) and are ground to an individual average particle size of between about 1 μm to about 10 μm, preferably about 1-3 μm. The polymeric binder material is substantially vehicle soluble although latexes are also eligible in some instances. Preferred

water soluble binders include polyvinyl alcohol, hydroxy ethylcellulose, methylcellulose, methylhydroxypropylcellulose, starch, modified starches, gelatin and the like. Eligible latex material include polyacrylates, styrene-butadiene-rubber latexes, polyvinylacetates, polystyrene, and the like.

Eligible chromogenic compounds, such as the phthalide, leucauramine, spiropyran and fluoran compounds, for use in the record systems of the invention are well known color-forming compounds. Examples of the compounds include Crystal Violet Lactone (3,3-bis(4-dimethylaminophenyl)-6-dimethylaminophthalide, U.S. Patent No. Re. 23,024); phenyl-, indol-, pyrrol-, and carbazol-substituted phthalides (for example, in U.S. Patent Nos. 3,491,111; 3,491,112; 3,491,116; 3,509,174); nitro-, amino-, amido-, sulfon amido-, aminobenzylidene-, halo-, anilino-substituted fluorans (for example, in U.S. Patent Nos. 3,624,107; 3,627,787; 3,641,011; 3,642,828; 3,681,390); spiro- dipyrans (U.S. Patent No. 3,971,808); and pyridine and pyrazine compounds (for example, in U.S. Patent Nos. 3,775,424 and 3,853,869). Other specifically eligible chromogenic compounds, not limiting the invention in any way, are: 3-diethylamino-6-methyl-7-anilino-fluoran (U.S. Patent No. 3,681,390); 2-anilino-3-methyl-6-dibutylamino-fluoran (U.S. Patent 4,510,513) also known as 3-dibutylamino-6-methyl-7-anilino-fluoran; 3-dibutylamino-7-(2-chloroanilino)fluoran; 3-(N-ethyl-N-tetrahydrofurfurylamino)-6-methyl-7-3,5'6-t ris(dimethylamino)spiro[9H-fluorene-9,1'(3'H)-isobenzofu ran]-3'-one; 7-(1-ethyl-2-methylindol-3-yl)-7-(4-diethylamino-2-ethox yphenyl)-5,7-dihydrofuro[3,4-b]pyridin-5-one (U.S. Patent No. 4,246,318); 3-diethylamino-7-(2-chloroanilino)fluoran (U.S. Patent No. 3,920,510); 3-(N-methylcyclohexylamino)-6-methyl-7-anilinofluoran (U.S. patent No. 3,959,571); 7-(1-octyl-2-methylindol-3-yl)-7-(4-diethylamino-2-ethox yphenyl)-5,7-dihydrofuro[3,4-b]pyridin-5-one; 3-diethylamino-7,8-benzofluoran; 3,3-bis(1-ethyl-2-methylindol-3-yl)phthalide; 3-diethylamino-7-anilinofluoran; 3-diethylamino-7-benzylaminofluoran; 3'-phenyl-7-dibenzylamino-2,2'-spiro-di-[2H-1-benzopyran] and mixtures of any of the following. The fluoran compounds are preferred. These materials can be used alone or in mixtures of two or more.

Examples of eligible acidic developer material which can be used in a mixture in thermal record systems along with the novel developers of the invention, include the compounds listed in U.S. Patent No. 3,539,375 as phenolic reactive material, particularly the monophenols and diphenols. Eligible acidic developer material also includes, without being considered as limiting, the following compounds which may be used individually or in mixtures: 4,4'-isopropylidenediphenol (Bisphenol A); p-hydroxybenzaldehyde; p-hydroxybenzophenone; p-hydroxypropiophenone; 2,4-dihydroxybenzophenone; 1,1-bis(4-hydroxyphenyl)cyclohexane;salicyanilide; 4-hydroxy-2-methylacetophenone; 2-acetylbenzoic acid; m-hydroxyacetanilide; p-hydroxyacetanilide; 2,4-dihydroxyacetophenone; 4-hydroxy-4'-methylbenzophenone; 4,4'-dihydroxybenzophenone; 2,2-bis(4-hydroxyphenyl)-4-methylpentane; benzyl 4-hydroxyphenyl ketone; 2,2-bis(4-hydroxyphenyl)-5-methylhexane; ethyl-4,4-bis(4-hydroxyphenyl)-pentanoate; isopropyl-4,4-bis(4-hydroxyphenyl)pentanoate; methyl-4,4-bis(4-hydroxyphenyl)pentanoate; allyl-4,4-bis(4-hydroxyphenyl)pentanoate; 3,3-bis (4-hydroxyphenyl)-pentane; 4,4-bis(4-hydroxyphenyl) heptane; 2,2-bis(4-hydroxyphenyl)-1-phenylpropane; 2,2-bis(4-hydroxyphenyl) butane; 2,2'-methylene-bis(4-ethyl-6-tertiarybutylphenol); 4-hydroxycoumarin; 7-hydroxy-4-methylcoumarin; 2,2'-methylene-bis(4-octyl phenol); 4,4'-sulfonyldiphenol; 4,4'-thio-bis(6-tertiarybutyl-m-cresol); methyl-p-hydroxybenzoate; n-propyl-p-hydroxybenzoate; benzyl-p-hydroxybenzoate. Preferred among these are the phenolic developer compounds. More preferred among the phenol compounds are 4,4'-isopropylidenediphenol, ethyl-4,4-bis (4-hydroxyphenyl)pentanoate, n-propyl-4,4-bis(4-hydroxyphenyl)pentanoate, isopropyl-4,4-bis(4-hydroxyphenyl) pentanoate, methyl-4,4-bis(4-hydroxyphenyl)pentanoate, 2,2-bis (4-hydroxyphenyl)-4-methylpentane, p-hydroxybenzophenone, 2,4-dihydroxybenzophenone, 1,1-bis(4-hydroxyphenyl) cyclohexane, and benzyl-p-hydroxybenzoate. Acid compounds of other kind and types are eligible.

In a pressure-sensitive record system, the application of pressure, as by typewriter, sufficient to rupture the microcapsules, releases solvent containing dissolved colorformer and brings it into reactive contact with the color developer coated on the second support, producing an image in the pattern of the applied pressure on the surface of the second support.

The developer compounds of this invention are eligible for use in pressure-sensitive and thermally-sensitive mark-forming systems. Pressure-sensitive mark-forming systems provide a marking system of disposing on and/or within sheet support material unreacted mark-forming components and a liquid solvent in which one or both of the mark-forming components is soluble, said liquid solvent being present in such form that it is maintained isolated by a pressure-rupturable barrier from at least one of the mark-forming components until application of pressure causes a breach of the barrier in the area delineated by the pressure pattern. The mark-forming components are thereby brought into reactive contact, producing a distinctive mark.

In the context of the present invention, color former material can include solid particles of color former alone or particles comprising color former dispersed or dissolved in resin.

The developer composition can be utilized in either a transfer carbonless copy paper system as disclosed hereinbefore or in a self-contained carbonless copy paper system such as disclosed in U.S. Patent Nos. 2,730,457 and 4,167,346. Many of both types of carbonless copy paper systems are exemplified in U.S. Patent No. 3,672,935.

In the transfer type carbonless record system, a coated back (CB) sheet and a coated front (CF) sheet is constructed.

The coating of the CB sheet can comprise the color developer material and microcapsules containing a liquid sol-

vent for the color former material coated on the CF sheet. The coating of the CB additionally preferably contains protective stilt material such as uncooked starch particles as disclosed in British Patents Nos. 1232347 and 1252858.

When the colorformer employed is a basic chromogenic material, then acidic developer material may be employed in the coating of the second support, such as, for example, clays; treated clays (U.S. Patent Nos. 3,622,364 and 3,753,761); aromatic carboxylic acids such as salicylic acid; derivatives of aromatic carboxylic acids and metal salts thereof (U.S. Patent No, 4,022,936); phenolic developers (U.S. Patent Nos. 3,244,550 and 4,573,063); acidic polymeric material such as phenol-formaldehyde polymers, etc. (U.S. Patent Nos. 3,455,721 and 3,672,935); and metal-modified phenolic resins (U.S. Patent Nos. 3,732,120; 3,737,410; 4,165,102; 4,165,103; 4,166,644 and 4,188,456).

The microcapsules for use in the coating of the CB sheet can be prepared by any of several processes well known in the disclosed art in such as 2,800,457; 3,533,958; 3,755,190; from gelatin as disclosed in U.S. Patent Nos. 3,800,457 and 3,041,289; or, more preferably, from urea-formaldehyde resin and/or melamine-formaldehyde resin as disclosed in U.S. Patent Nos. 4,001,140; 4,081,376; 4,089,802; 4,100,103; 4,105,823; 4,444,699; or 4,552,811.

The liquid solvent employed in the microcapsules can be any material which has sufficient solubility for the color former material, which is liquid within the temperature range at which carbonless copy paper is normally used and which does not suppress or otherwise adversely affect the color-forming reaction. Examples of eligible liquids include, but are not limited to, those solvents conventionally used for carbonless copy paper, including ethyldiphenylmethane (U.S. Patent No. 3,996,406); benzylxylenes (U.S. Patent No. 4,130,299); alkyl biphenyls such as propylbiphenyl (U.S. Patent Nos. 3,627,581) and butylbiphenyl (U.S. Patent No. 4,287,074); dialkyl phthalates in which the alkyl groups thereof have from 4 to 13 carbon atoms, e.g. dibutyl phthalate, dioctylphthalate, dinonyl phthalate and ditridecylphthalate; 2,2,4-trimethyl-1,3-pentanediol diisobutyrate (U.S. Patent No. 4,027,065); C_{10}-C_{14} alkyl benzenes such as dodecyl benzene; alkyl or aralkyl benzoates such as benzyl benzoate; alkylated naphthalenes such as dipropylnaphthalene (U.S. Patent No. 3,806,463); partially hydrogenated terphenyls; high boiling straight or branched chain hydrocarbons; and mixtures of the above.

The following examples are given merely as illustrative of the present invention and are not to be considered as limiting. All figures, percentages, and parts throughout the application are by weight and in the metric system unless otherwise specified.

The color developing potential of the compounds is tested for thermal systems by heating an equal amount of chromogenic compound and test developer on a glass slide and observing the color produced, Table 1. Some of the compounds were also tested in coatings on paper. Separate dispersions, Table 2, of chromogenic material and developer were made and mixed at various ratios. Additional materials such as filler, lubricant and sensitizer were added, Table 3. The thermal response of the coatings was tested by contacting a heated metal block for 5 seconds and reading the color product with a MacBeth densitometer, Table 4. The coatings were also tested on a laboratory test printer, Table 5.

The data in Tables 4 and 5 shows that the compounds of the invention, examples 1 thru 4, are equal to or better than two common developer compounds, controls 1 and 2. The data for examples 5 thru 12 shows the improved thermal response obtained with a mixture of the invention compounds and the commercial compounds. The data for examples 14 thru 19 demonstrates improved thermal response obtained with a commercial sensitizing agent. Example 13 serves as a control. Examples 20-25 describe more preferred combinations.

The examples given are only illustrative and other colorformers, developers and sensitizers would be usable with the compounds of the invention, for example sensitizer can alternatively be acetoacet-o-toluidine or phenyl-1-hydroxy-2-naphthoate.

The potential for pressure sensitive systems is demonstrated by coating a support with a dispersion of developer, and dropping a solution of colorformer on the surface, Table 6.

Table 1

Color of Melts		
Colorformer	Developer	Color Observed
N-102	Bisphenol A(control)	Black
N-102	AP-5 (control)	Black
N-102	# 1	Black
N-102	# 2	Black
N-102	# 3	Black
N-102	# 4	Black
N-102	# 5	Black
N-102	# 6	Red-Brown

Table 2

Dispersions		
Dispersion A -	Chromogenic Material	Parts
	Chromogenic Material	94.95
	Binder, 20% Solution of Polyvinyl Alcohol (Vinol 203) in water	81.00
	Defoaming & Dispersing Agents	1.36
	Water	122.69
Dispersion A-1 -	Chromogenic Material is N-102 3-diethylamino-6-methyl-7-anilinofluoran	
Dispersion A-2 -	Chromogenic material is Bu N-102 3-dibutylamino-6-methyl-7-anilinofluoran	
Dispersion B -	Color Developing Material	Parts
	Developer Material	17.00
	Binder, 20% Solution of polyvinyl alcohol (Vinol 205) in water	14.50
	Defoaming & Dispersing Agent	0.12
	Water	68.38
Dispersion B-1 -	Developer Material is Bis-A 4,4'-isopropylidenediphenol	
Dispersion B-2 -	Developer Material is AP-5 2,2-bis(4-hydroxyphenyl)-4-methylpentane	
Dispersion B-3 -	Developer Material is Compound #1 Phenol, 4-[1-(4-methoxyphenyl)-1,3-dimethylbutyl]-	
Dispersion B-4 -	Developer Materials is Compound #2 Phenol, 4-[1-ethyl-1-(methoxyphenyl)propyl]-	
Dispersion B-5 -	Developer Material is Compound #3 Phenol, 4-[1-(4-methoxyphenyl)-1-methylpropyl]-	
Dispersion B-6 -	Developer Material is Compound #4 Phenol, 4-[1-(4-methoxyphenyl)cyclohexyl]-	
Dispersion B-7 -	Developer Material is BisM 4,4'-[1,3-phenylenebis(1-methylethylidene]bisphenol	
Dispersion B-8 -	Developer Material is D-8 4-[(4-(1-methylethoxy)phenyl)sulfonylphenol	
Dispersion C -	Sensitizer Material	Parts
	Sensitizer Material	17.00
	Binder, 20% Solution of Polyvinyl Alcohol in Water	14.50
	Defoaming & Dispersing Agents	0.12
	Water	68.38
Dispersion C-1 -	Sensitizer Material is DPE 1,2-diphenoxyethane	
Dispersion C-2 -	Sensitizer Material is pBB p-benzylbiphenyl	
Dispersion C-3 -	Sensitizer Material is DBT dibenzylterephthalate	
Dispersion C-4 -	Sensitizer Material is DBO dibenzyl oxalate	

Table 3

Test Formulations		
	Material	Parts
Control-1	Dispersion A-1	0.53
	Dispersion B-1	7.00
	Filler	0.40
	Zinc stearate (23%)	1.00
	PVA (Vinol 325 10%)	2.80
	Water	0.60
Control-2	Same as Control-1 but replace B-1 with B-2	
Example-1	Same as Control-1 but replace B-1 with B-3	
Example-2	Same as Control-1 but replace B-1 with B-4	
Example-3	Same as Control-1 but replace B-1 with B-5	
Example-4	Same as Control-1 but replace B-1 with B-6	
Example-5	Same as Control-1 but replace B-1 with 1:1 mix B-1/B-3	
Example-6	Same as Control-2 but replace B-2 with 1:1 mix B-2/B-3	
Example-7	Same as Control-1 but replace B-1 with 1:1 mix B-1/B-4	
Example-8	Same as Control-2 but replace B-2 with 1:1 mix B-2/B-4	
Example-9	Same as Control-1 but replace B-1 with 1:1 mix B-1/B-5	
Example-10	Same as Control-2 but replace B-2 with 1:1 mix B-2/B-5	
Example-11	Same as Control-1 but replace B-1 with 1:1 mix B-1/B-6	
Example-12	Same as Control-2 but replace B-2 with 1:1 mix B-2/B-6	
Example-13	Same as Control-2 but replace B-2 with 1:1 mix B-2/C-1	
Example-14	Same as Control-2 but replace B-2 with 1:1 mix B-3/C-1	
Example-15	Same as Control-2 but replace B-2 with 1:1:2 mix B-2/B-3/C-1	
Example-16	Same as Control-1 but replace B-1 with 1:1:2 mix B-1/B-3/C-1	
Example-17	Same as Control-2 but replace B-2 with 1:1:2 mix B-2/B-4/C-1	
Example-18	Same as Control-2 but replace B-2 with 1:1:2 mix B-2/B-5/C-1	
Example-19	Same as Control-2 but replace B-2 with 1:1:2 mix B-2/B-6/C-1	
Example-20	Same as Control-1 but replace A-1 with A-2 and B-1 with 1:1:2 mix B-2/B-3/C-2	
Example-21	Same as Example-20 but replace C-2 with C-3 in mix	
Example-22	Same as Example-20 but replace C-2 with C-4 in mix	
Example-23	Same as Control-1 but replace A-1 with A-2 and B-1 with 1:1:2 mix B-1/B-3/C-1	
Example-24	Same as Example-23 but replace B-1 with B-7 in mix	
Example-25	Same as Example-23 but replace B-1 with B-8 in mix	

Table 4: Static Test

Temperature °C(°F)/Macbeth Reading

Sample	149(300)	135(275)	127(260)	118(245)	110(230)	102(215)	93(200)	85(185)	77(170)	68(155)	60(140)
Control-1	1.40	1.37	1.33	1.11	0.63	0.32	0.19	0.12	0.08	0.07	0.06
Control-2	1.44	1.32	1.20	1.02	0.45	0.15	0.09	0.04	0.02	0.02	0.02
Example-1	1.36	1.34	1.33	1.33	1.14	0.23	0.09	0.04	0.02	0.02	0.02
Example-2	1.36	1.35	1.35	1.29	0.72	0.31	0.09	0.04	0.03	0.03	0.03
Example-3	1.45	1.40	1.38	1.38	1.28	0.79	0.28	0.06	0.04	0.04	0.04
Example-4	1.44	1.44	1.44	1.44	1.38	1.04	0.68	0.23	0.15	0.12	0.12
Example-5	1.39	1.36	1.37	1.34	1.34	1.05	0.61	0.17	0.09	0.07	0.07
Example-6	1.40	1.35	1.35	1.36	1.30	0.81	0.33	0.08	0.04	0.03	0.03
Example-7	1.42	1.39	1.40	1.38	1.40	1.34	0.88	0.33	0.11	0.09	0.06
Example-8	1.40	1.38	1.38	1.37	1.30	0.81	0.34	0.72	0.05	0.02	0.02
Example-9	1.39	1.36	1.35	1.36	1.35	1.34	1.15	0.53	0.20	0.08	0.08
Example-10	1.41	1.43	1.40	1.36	1.37	1.24	0.87	0.14	0.05	0.02	0.02
Example-11	1.41	1.39	1.40	1.39	1.39	1.38	1.13	0.63	0.40	0.26	0.21

Table 4: Static Test (cont.)

Temperature °C(°F)/Macbeth Reading

Sample	149(300)	135(275)	127(260)	118(245)	110(230)	102(215)	93(200)	85(185)	77(170)	68(155)	60(140)
Example-12	1.41	1.40	1.41	1.39	1.39	1.34	0.80	0.32	0.15	0.09	0.08
Example-13	1.40	1.39	1.39	1.38	1.33	1.27	1.20	0.82	0.15	0.05	0.04
Example-14	1.34	1.33	1.32	1.35	1.30	1.26	1.18	1.01	0.19	0.04	0.03
Example-15	1.43	1.40	1.37	1.37	1.33	1.34	1.31	1.25	0.69	0.02	0.01
Example-16	1.39	1.36	1.37	1.34	1.34	1.33	1.30	1.22	0.79	0.14	0.07
Example-17	1.36	1.36	1.35	1.34	1.34	1.34	1.33	1.29	1.09	0.19	0.05
Example-18	1.38	1.38	1.37	1.38	1.38	1.38	1.38	1.41	1.21	0.47	0.08
Example-19	1.34	1.33	1.33	1.32	1.30	1.31	1.32	1.30	1.17	0.63	0.22
Example-20	1.32	1.32	1.25	1.26	1.26	1.26	1.21	.93	.63	.02	.02
Example-21	1.34	1.33	1.30	1.29	1.27	.95	.55	.25	.03	.03	.03
Example-22	1.28	1.35	1.29	1.28	1.26	1.23	1.23	1.01	.72	.43	.02
Example-23	1.34	1.32	1.29	1.29	1.27	1.24	1.26	1.14	.56	.03	.03
Example-24	1.38	1.36	1.35	1.35	1.30	1.29	1.31	1.13	.54	.03	.03
Example-25	1.36	1.34	1.30	1.32	1.29	1.28	1.22	1.22	.97	.10	.04

Table 5

Dynamic Test											
Sample	Pulse ms(18 volt)/Macbeth Reading										
	0.50	0.70	0.90	1.10	1.30	1.50	1.70	1.90	2.10	2.30	2.50
Control-1	0.13	0.20	0.28	0.40	0.65	0.90	1.21	1.33	1.33	1.35	1.36
Control-2	0.12	0.18	0.31	0.50	0.70	0.98	1.09	1.24	1.26	1.27	1.28
Example-1	0.11	0.22	0.39	0.60	0.92	1.08	1.15	1.24	1.24	1.26	1.26
Example-2	0.07	0.18	0.31	0.48	0.66	0.92	1.09	1.16	1.23	1.27	1.28
Example-3	0.10	0.19	0.38	0.63	0.95	1.08	1.23	1.29	1.33	1.30	1.31
Example-4	0.20	0.31	0.50	0.73	1.00	1.13	1.29	1.30	1.33	1.31	1.32
Example-5	0.15	0.27	0.45	0.69	1.01	1.18	1.25	1.26	1.26	1.28	1.28
Example-6	0.13	0.26	0.43	0.65	0.91	1.13	1.23	1.25	1.25	1.27	1.29
Example-7	0.14	0.23	0.44	0.63	0.98	1.24	1.30	1.34	1.34	1.36	1.36
Example-8	0.08	0.14	0.26	0.44	0.66	0.85	1.06	1.25	1.27	1.30	1.30
Example-9	0.18	0.31	0.48	0.85	1.16	1.25	1.28	1.30	1.29	1.30	1.31
Example-10	0.11	0.22	0.46	0.61	1.06	1.24	1.39	1.41	1.42	1.44	1.42
Example-11	0.27	0.38	0.52	0.72	1.05	1.30	1.31	1.32	1.35	1.35	1.35
Example-12	0.14	0.24	0.42	0.72	1.00	1.22	1.29	1.34	1.36	1.34	1.36
Example-13	0.25	0.52	0.79	1.02	1.10	1.15	1.21	1.24	1.26	1.29	1.28
Example-14	0.21	0.45	0.72	0.95	1.09	1.10	1.13	1.17	1.15	1.18	1.15
Example-15	0.19	0.41	0.65	0.96	1.10	1.15	1.20	1.23	1.23	1.23	1.23
Example-16	0.17	0.38	0.62	0.86	1.00	1.07	1.10	1.16	1.16	1.18	1.18
Example-17	0.16	0.37	0.69	1.01	1.17	1.28	1.33	1.32	1.33	1.29	1.32
Example-18	0.17	0.38	0.69	1.09	1.23	1.34	1.34	1.38	1.40	1.39	1.42
Example-19	0.27	0.47	0.78	1.07	1.20	1.28	1.30	1.31	1.31	1.32	1.32

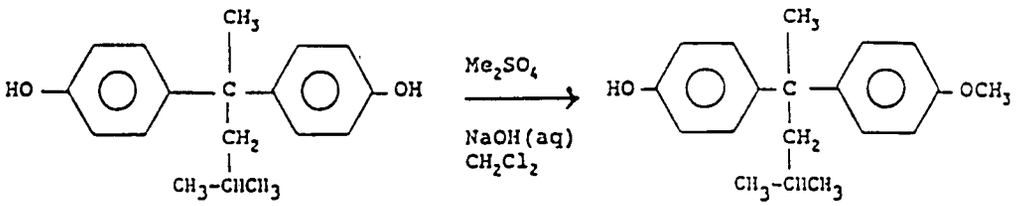
Table 6

Color from Solvent		
Developer	Colorformer/Solvent	Color
Produced		
1. B-3: Phenol, 4-[1- N-102/Acetone (4-methoxyphenyl)-1,3-dimethylbutyl]-		Black
2. B-3	Bu N-102/Acetone	Black
3. B-3	Crystal Violet Lactone (CVL) Acetone	Blue

Example 26

Synthesis of 4-[1-4(-methoxyphenyl)-1,3-dimethylbutyl]phenol

NaOH(6.0g, 0.15 mole) was dissolved in H_2O(300 ml). Then 2,2-bis(4-hydroxyphenyl)-4-methylpentane (13.5g, 0.05 mole) was dissolved in the aqueous NaOH solution.



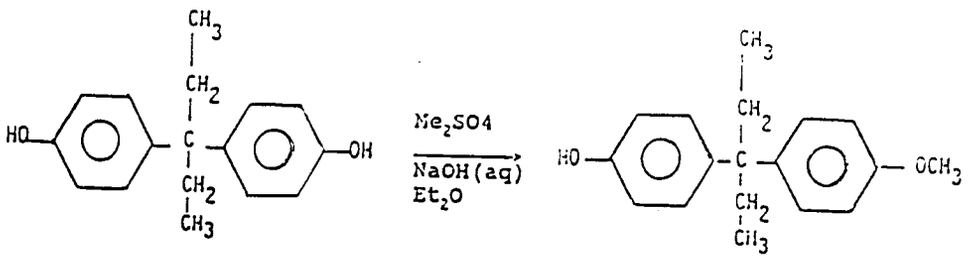
Dimethylsulfate (9.5 ml, 0.1 mole) was dissolved in CH_2Cl_2 (300 ml).

The two solutions were stirred together at room temperature in a 1 1 erlenmeyer flask for 22.5 hours.

The organic layer was separated. The aqueous layer was extracted with CH_2Cl_2. The combined organic layers were concentrated under reduced pressure to give a white solid (13.1 g). The white solid was mixed with H_2O, and then extracted with diethyl ether. The ether extract was washed with 2N ammonia (aq), 2N NaOH (aq), and saturated aqueous NaCl. Then the ether extract was dried over "Drierite" (trademark), filtered, and concentrated under reduced pressure to give a white solid. The solid was dried in a 70°C oven for 22 hours to give 11.4g of 4-[1-(4-methoxyphenyl)-1,3-dimethylbutyl]phenol (80% yield, mp 119-122°C).

Example 27

Synthesis of 4-[1-ethyl-1-(4-methoxyphenyl)propyl]-phenol

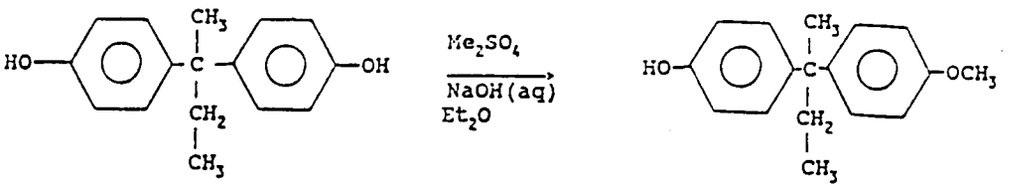


Dimethylsulfate (8ml, 0.08 mole) was dissolved in ethyl ether (350 ml). NaOH(5.3g, 0.13 mole) was dissolved in H_2O(350 ml). 4-[1-Ethyl-1-(4-hydroxy phenyl)propyl]-phenol (11.0g, 0.043 mole) was dissolved in the NaOH solution.

The two solutions were stirred together at room temperature for 25 hours. The ethyl ether layer was separated, washed with H_2O, 2N Ammonia (aq), and 2N NaOH(aq), dried over "Drierite", filtered, and concentrated in vacuo to give 9.0g of 4-[1-ethyl-1-(4-methoxyphenyl)propyl]phenol (77% Yield, mp 124-126°C).

Example 28

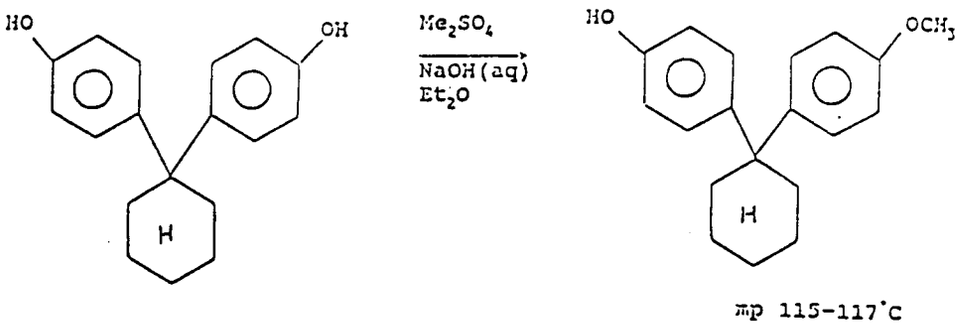
Synthesis of 4-[1-(4-methoxyphenyl)-1-methylpropyl]-phenol



Dimethylsulfate (14ml, 0.15 mole) was dissolved in ethyl ether (350ml). NaOH (12.0g, 0.3 mole) was dissolved in water (350ml). 4-[1-(4-hydroxy-phenyl)-1-methylpropyl]-phenol (24.2g, 0.1 mole) was dissolved in the NaOH solution. Then the two solutions were stirred together at room temperature for 24 hours. The ethyl ether layer was separated. The water layer was washed with ethyl ether. The combined ethyl ether layers were washed with H_2O and 2N Ammonia (aq), and H_2O again and then dried over "Drierite", filtered, and concentrated in vacuo. This gave a white solid which was recrystallized from hot ethyl ether to give 12.6g of 4-[1-(4-methoxyphenyl)-1-methylpropyl]-phenol (49% Yield, mp 112-113°C).

Example 29

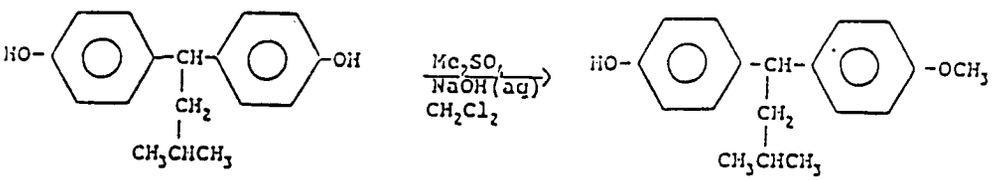
Synthesis of 4-[1-(4-methoxyphenyl)cyclohexyl]-phenol



Dimethylsulfate (7ml, 0.075 mole) was dissolved in ethyl ether (350ml). NaOH(6.0g, 0.15 mole) was dissolved in water (350 ml). 1,1-Bis(4-hydroxyphenyl) cyclohexane (13.4g, 0.05 mole) was added to the NaOH solution. Not all of the 1,1-Bis(4-hydroxy-phenyl)cyclohexane dissolved in the aqueous NaOH. Then the two mixtures were stirred together at room temperature for 18.5 hours. The ethyl ether layer was separated. The H_2O layer was washed with ethyl ether. The combined ethyl ether layers were washed with water, 2N Ammonia (aq) and water again. Then the ethyl ether layer was dried over "Drierite", filtered and concentrated under reduced pressure to give 9.3g of 4-[1-(4-methoxyphenyl)cyclohexyl]-phenol (65% yield, mp 115-117°C).

Example 30

Synthesis of 4-[1-(4-methoxyphenyl)-3-methylbutyl]-phenol

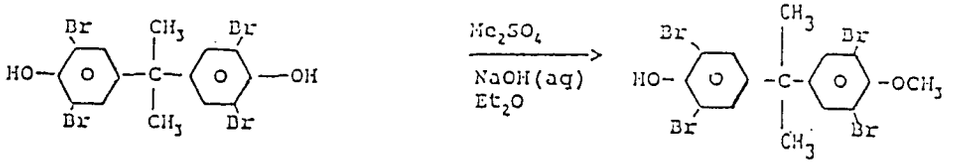


mp 79-80°C

Dimethylsulfate (1.0 ml, 0.011 mole) was dissolved in CH_2Cl_2(50ml). NaOH (0.99g, 0.025 mole) was dissolved in H_2O(50 ml). Then 4-[1-(4-hydroxy-phenyl)-3-methylbutyl]-phenol (1.2g, 4.7 mmole) was dissolved in the aqueous NaOH. The two solutions were stirred together for 22 hours. The organic layer was separated. The aqueous layer was extracted with CH_2Cl_2. The combined organic layers were evaporated under reduced pressure. The residue was mixed with water. The mixture was extracted with diethyl ether. The ether extract was washed with 2N Ammonia (aq) and 2N NaOH (aq). Then it was dried over "Drierite", filtered, and concentrated under reduced pressure to give 0.6g of a viscous Liquid. This slowly turned to a white solid identified as 4-[1-(4-methoxyphenyl)-3-methylbutyl]-phenol (47% yield, mp 79-80°C).

Example 31

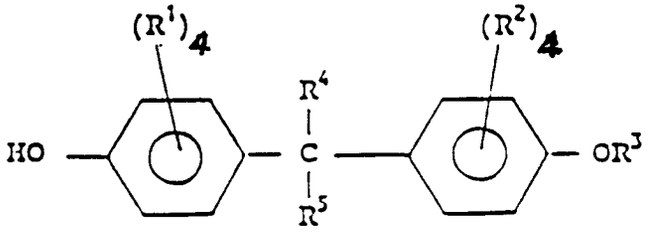
4-[1-(3,5-Dibromo-4-methoxyphenyl)-1-methylethyl]-2,6-dibromo-phenol



Dimethylsulfate (1.2 ml,.013 mole) was dissolved in diethyl ether (30 ml). NaOH (1.2g, 0.03 mole) was dissolved in H_2O (30 ml). Then tetrabromobisphenol A (5.4g, 0.01 mole) was dissolved in the NaOH solution. The two solutions were stirred together at room temperature for 23 hours. A small amount of precipitate formed which was removed by filtration. Then the ethyl ether layer was separated. The H_2O layer was washed with ethyl ether. The combined ether layers were washed with H_2O, 2N Ammonia (aq) and H_2O again. The ether layer was dried over drierite, filtered, and evaporated in vacuo to give 1.4g of a white solid (mp 126-140°). GC analysis showed this to be a mixture of compounds. Some precipitate formed in the aqueous wash. This was collected by filtration to give 1.08g of 4-[1-(3,5-dibromo-4-methoxyphenyl)-1-methylethyl]-2,6-dibromophenol (19% yield, mp 133-134°C).

Claims

1. A record material comprising a substrate and a color developer material, characterized in that the color developer material comprises a substituted phenol of the formula

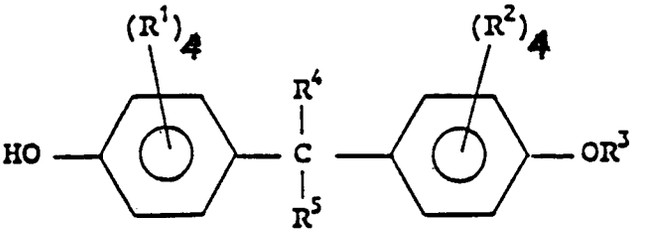


wherein:

each of R^1 and R^2 is independently hydrogen, C_1-C_8 alkyl, or halogen;
R^3 is allyl, benzyl or C_1-C_4 alkyl; and
either each of R^4 and R^5 is independently hydrogen or C_1-C_8 alkyl, or R_4 and R_5 together form a 5 or 6 membered alkyl ring;

with the proviso that when R^4 and R^5 are both methyl and R^1 and R^2 are both hydrogen, R^3 is not benzyl.

2. A record material comprising a substrate and a color developer material, characterized in that the color developer material comprises an alkoxyphenylalkylphenol of the formula

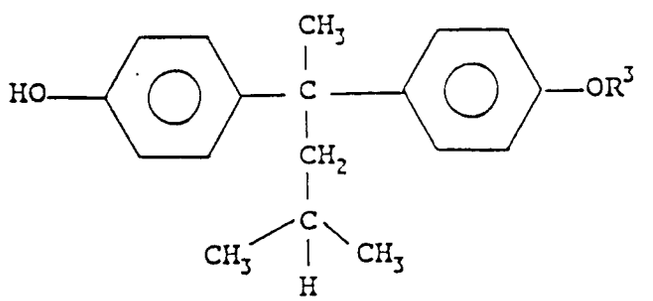


wherein:

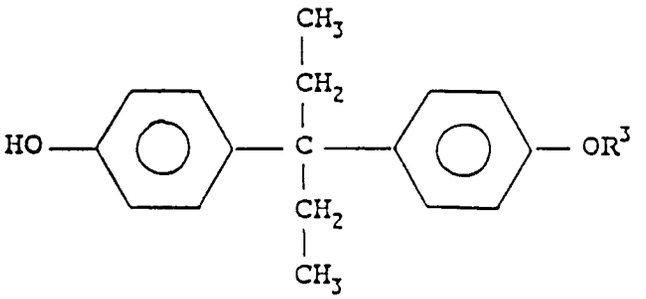
each of R^1 and R^2 is independently hydrogen or halogen;
R^3 is C_1-C_4 alkyl; and
either each of R^4 and R^5 is independently hydrogen or C_1-C_8 alkyl, or R^4 and R^5 together form a 5 or 6 membered alkyl ring.

3. The record material according to Claim 2 wherein in the formula of the alkoxyphenylalkylphenol, R^1 and R^2 are hydrogen.

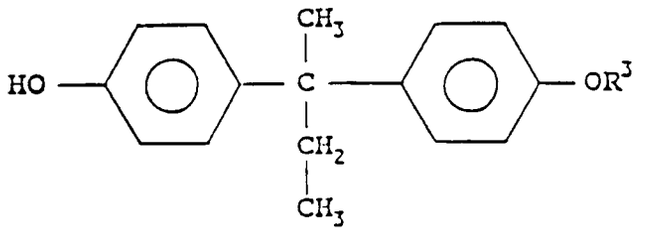
4. The record material according to claim 3 wherein the developer material comprises



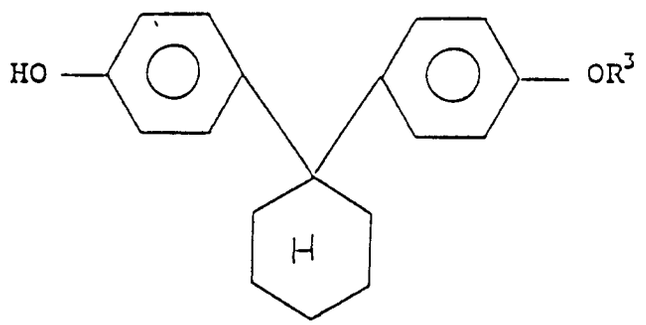
5. The record material according to Claim 3 wherein the developer material comprises



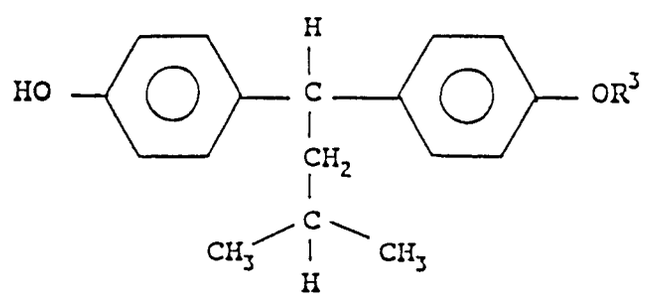
6. The record material according to Claim 3 wherein the developer material comprises



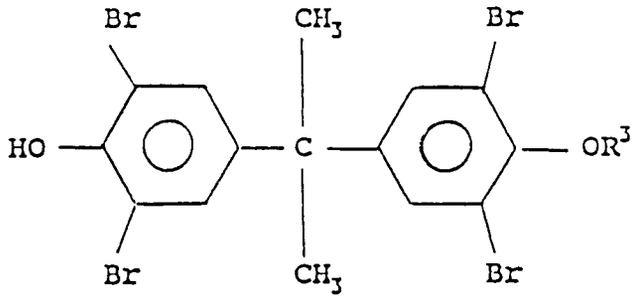
7. The record material according to Claim 3 wherein the developer material comprises



8. The record material according to Claim 3 wherein the developer material comprises



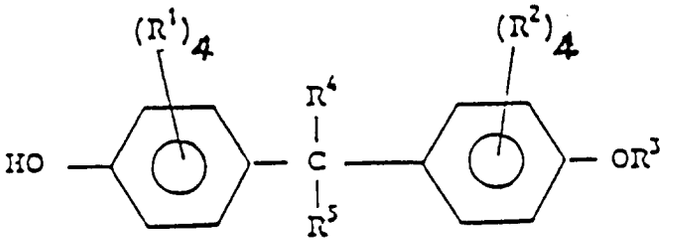
9. The record material according to Claim 2 wherein the developer material comprises



10. The record material according to any one of claims 3 to 9 wherein R^3 is methyl.

Patentansprüche

1. Aufzeichnungsmaterial, umfassend ein Substrat und ein Farbentwicklermaterial, dadurch gekennzeichnet, daß das Farbentwicklermaterial ein substituiertes Phenol nach Formel



umfaßt, wobei:

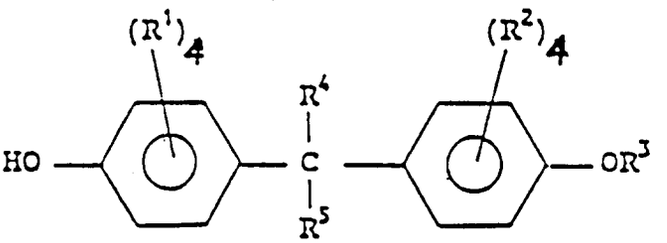
R^1 und R^2 jeweils unabhängig voneinander Wasserstoff, C_1-C_8 Alkyl oder Halogen sind,

R^3 Allyl, Benzyl oder C_1-C_4 Alkyl ist, und

R^4 und R^5 entweder jeweils unabhängig voneinander Wasserstoff oder C_1-C_8 Alkyl sind oder R^4 und R^5 zusammen einen 5- oder 6-gliedrigen Alkylring bilden,

unter der Maßgabe, daß wenn sowohl R^4 als auch R^5 Methyl ist und sowohl R^1 als auch R^2 Wasserstoff ist, R^3 nicht Benzyl ist.

2. Aufzeichnungsmaterial, umfassend ein Substrat und ein Farbentwicklermaterial, dadurch gekennzeichnet, daß das Farbentwicklermaterial ein Alkoxyphenylalkylphenol nach Formel



umfaßt, wobei:

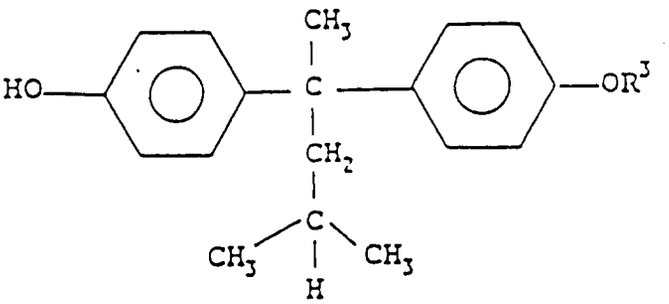
R^1 und R^2 jeweils unabhängig voneinander Wasserstoff oder Halogen sind,

R^3 C_1-C_4 Alkyl ist, und

R^4 und R^5 entweder jeweils unabhängig voneinander Wasserstoff oder C_1-C_8 Alkyl sind oder R^4 und R^5 zusammen einen 5- oder 6-gliedrigen Alkylring bilden.

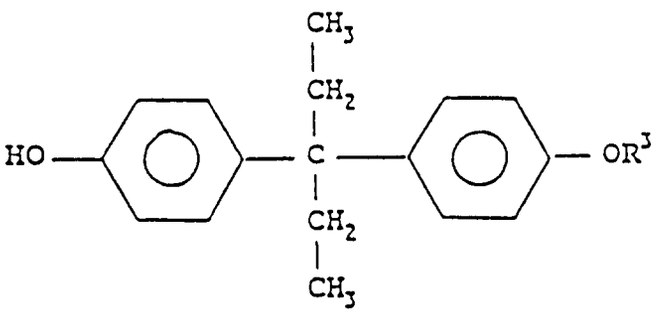
3. Aufzeichnungsmaterial nach Anspruch 2, wobei R^1 und R^2 in der Formel des Alkoxyphenylalkylphenols Wasserstoff sind.

4. Aufzeichnungsmaterial nach Anspruch 3, wobei das Farbentwicklermaterial



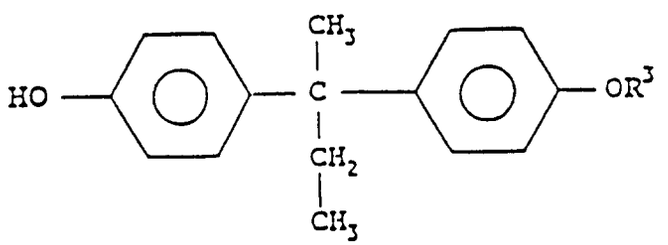
umfaßt.

5. Aufzeichnungsmaterial nach Anspruch 3, wobei das Farbentwicklermaterial



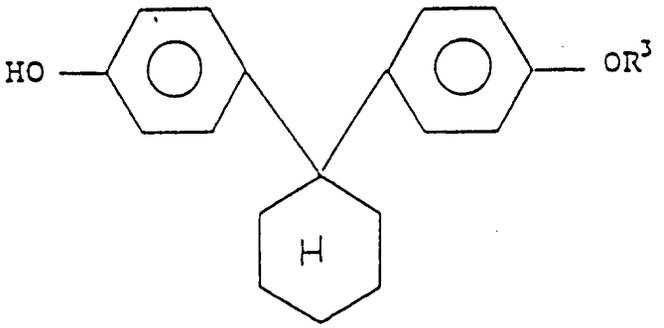
umfaßt.

6. Aufzeichnungsmaterial nach Anspruch 3, wobei das Farbentwicklermaterial



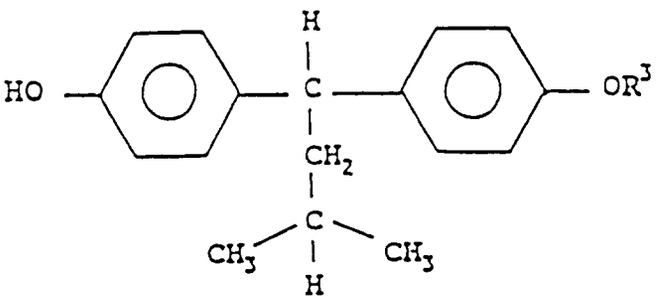
umfaßt.

7. Aufzeichnungsmaterial nach Anspruch 3, wobei das Farbentwicklermaterial



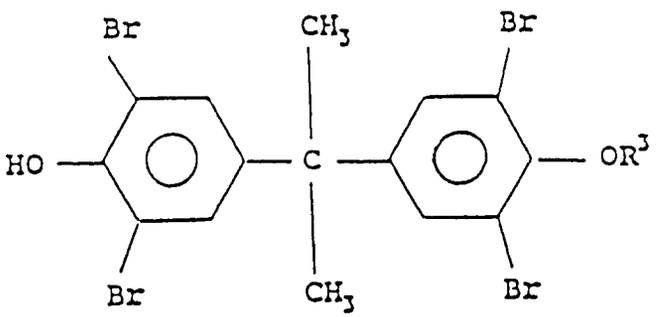
umfaßt.

8. Aufzeichnungsmaterial nach Anspruch 3, wobei das Farbentwicklermaterial



umfaßt.

9. Aufzeichnungsmaterial nach Anspruch 2, wobei das Farbentwicklermaterial

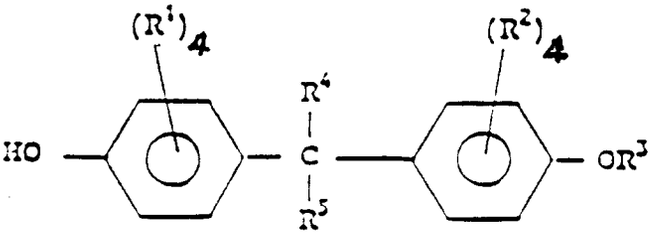


umfaßt.

10. Aufzeichnungsmaterial nach einem der Ansprüche 3 bis 9, wobei R^3 Methyl ist.

Revendications

1. Matériau d'enregistrement comprenant un support et une matière développatrice ou révélatrice de couleur, caractérisé en ce que la matière révélatrice ou développatrice de couleur est constituée d'un phénol substitué de la formule

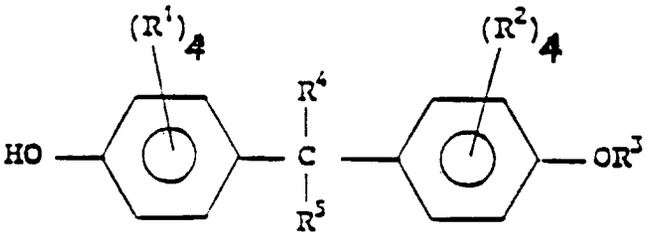


dans laquelle :

chacun des symboles R^1 et R^2 représente indépendamment un atome d'hydrogène, un radical alkyle en C_1 à C_8, ou un atome d'halogène,
R^3 représente un radical allyle, benzyle ou alkyle en C_1 à C_4 et
chacun des symboles R^4 et R^5 représente indépendamment un atome d'hydrogène ou un radical alkyle en C_1 à C_8, ou bien R^4 et R^5 forment ensemble un cycle alkyle pentagonal ou hexagonal,

avec la condition que lorsque R^4 et R^5 représentent tous deux des radicaux méthyle et que R^1 et R^2 représentent tous deux des atomes d'hydrogène, R^3 ne représente pas de radical benzyle.

2. Matériau d'enregistrement comprenant un support et une matière développatrice ou révélatrice de couleur, caractérisé en ce que la matière révélatrice ou développatrice de couleur est constituée d'un alcoxyphénylalkylphénol de la formule

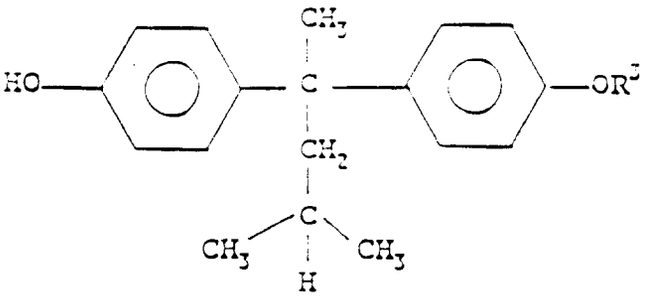


dans laquelle :

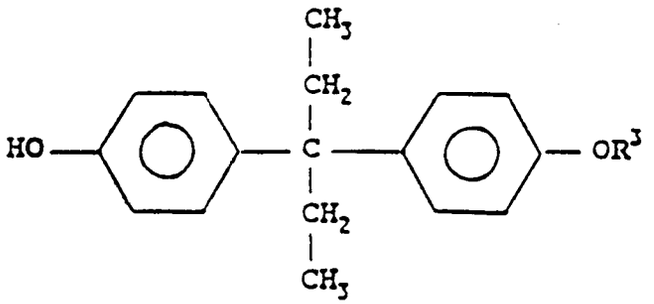
chacun des symboles R^1 et R^2 représente indépendamment un atome d'hydrogène ou d'halogène,
R^3 représente un radical alkyle en C_1 à C_4 et
chacun des symboles R^4 et R^5 représente indépendamment un atome d'hydrogène ou un radical alkyle en C_1 à C_8, ou bien R^4 et R^5 forment ensemble un cycle alkyle pentagonal ou hexagonal.

3. Matériau d'enregistrement suivant la revendication 2, caractérisé en ce que, dans la formule de l'alcoxyphénylalkylphénol, R^1 et R^2 représentent des atomes d'hydrogène.

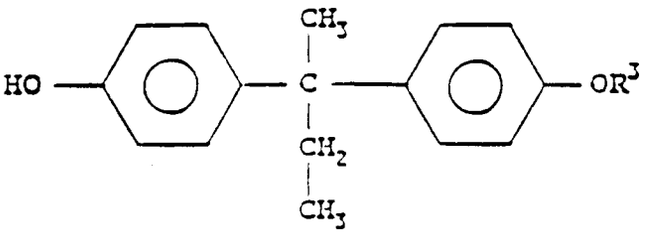
4. Matériau d'enregistrement suivant la revendication 3, caractérisé en ce que la matière développatrice ou révélatrice de couleur est constituée de



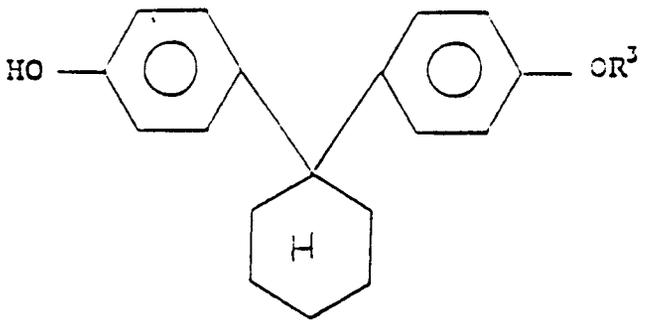
5. Matériau d'enregistrement suivant la revendication 3, caractérisé en ce que la matière développatrice ou révélatrice de couleur est constituée de



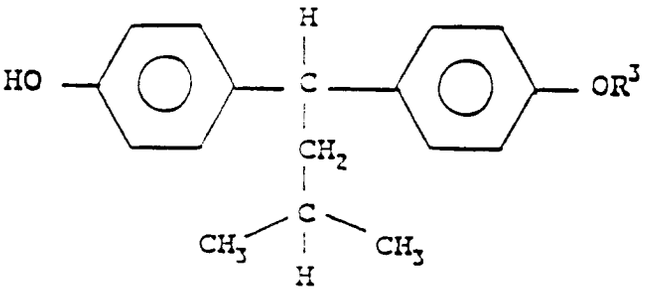
6. Matériau d'enregistrement suivant la revendication 3, caractérisé en ce que la matière développatrice ou révélatrice de couleur est constituée de



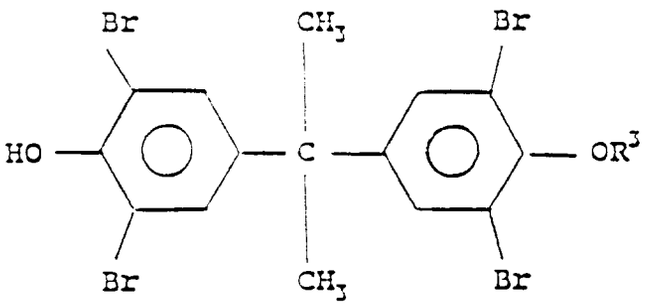
7. Matériau d'enregistrement suivant la revendication 3, caractérisé en ce que la matière développatrice ou révélatrice de couleur est constituée de



8. Matériau d'enregistrement suivant la revendication 3, caractérisé en ce que la matière développatrice ou révélatrice de couleur est constituée de



9. Matériau d'enregistrement suivant la revendication 3, caractérisé en ce que la matière développatrice ou révélatrice de couleur est constituée de



10. Matériau d'enregistrement suivant l'une quelconque des revendications 3 à 9, caractérisé en ce que R^3 représente le radical méthyle.