(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 749 847 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
14.04.1999 Bulletin 1999/15

(51) Int. Cl.[6]: **B41M 5/40**

(21) Application number: **96201632.5**

(22) Date of filing: **12.06.1996**

(54) Magnetic layer in dye-donor element for thermal dye transfer

Magnetische Schicht im farbgebenden Element für thermische Farbübertragung

Couche magnétique dans l'élément donnant le colorant pour le transfert thermique du colorant

(84) Designated Contracting States:
DE FR GB

(30) Priority: **23.06.1995 US 462**
12.02.1996 US 559692

(43) Date of publication of application:
27.12.1996 Bulletin 1996/52

(73) Proprietor:
EASTMAN KODAK COMPANY
Rochester, New York 14650-2201 (US)

(72) Inventors:
- **Flosenzier, Linda S.,**
  c/o Eastman Kodak Co.
  Rochester, New York 14650-2201 (US)
- **James, Robert Owen,**
  c/o Eastman Kodak Co.
  Rochester, New York 14650-2201 (US)
- **Walker, Philip G.,**
  c/o Eastman Kodak Co.
  Rochester, New York 14650-2201 (US)

(74) Representative:
Wibbelmann, Jobst, Dr., Dipl.-Chem. et al
Wuesthoff & Wuesthoff,
Patent- und Rechtsanwälte,
Schweigerstrasse 2
81541 München (DE)

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US-A- 4 717 711 **US-A- 5 342 671**

- **PATENT ABSTRACTS OF JAPAN, unexamined applications, M section, vol. 16, no. 370, August 10, 1992 THE PATENT OFFICE JAPANESE GOVERNMENT page 136 M 1292; & JP-A-04 118 289 (OJI PAPER CO LTD)**

EP 0 749 847 B1

Description

[0001] This invention relates to a dye-donor element used in thermal dye transfer, and more particularly to the use of a magnetic recording layer underneath a slipping layer on the back side thereof.

[0002] In recent years, thermal transfer systems have been developed to obtain prints from pictures which have been generated electronically from a color video camera. According to one way of obtaining such prints, an electronic picture is first subjected to color separation by color filters. The respective color-separated images are then converted into electrical signals. These signals are then operated on to produce cyan, magenta and yellow electrical signals. These signals are then transmitted to a thermal printer. To obtain the print, a cyan, magenta or yellow dye-donor element is placed face-to-face with a dye-receiving element. The two are then inserted between a thermal printing head and a platen roller. A line-type thermal printing head is used to apply heat from the back of the dye-donor sheet. The thermal printing head has many heating elements and is heated up sequentially in response to the cyan, magenta and yellow signals. The process is then repeated for the other two colors. A color hard copy is thus obtained which corresponds to the original picture viewed on a screen. Further details of this process and an apparatus for carrying it out are contained in U.S. Patent No. 4,621,271 by Brownstein entitled "Apparatus and Method for Controlling A Thermal Printer Apparatus," issued November 4, 1986.

[0003] A slipping layer is usually provided on the backside of the dye-donor element to prevent sticking to the thermal head during printing. A subbing layer is also usually needed to promote adhesion between the support and the slipping layer.

[0004] In many instances during thermal dye transfer printing, it would be advantageous to have certain information recorded directly on the thermal dye-transfer element. Examples for potentially useful information would be specific product identification, sensitometric information, recording of the number of print areas remaining on the spool, dye patch position relative to the printer heat line, and so forth.

[0005] U.S. Patent 5,342,671 discloses the use of a transparent magnetic layer on a dye-receiver element. However, there is no disclosure in this patent of the use of magnetic layers in a dye-donor element.

[0006] JP-A-4/118289 describes an image and data recording sheet, which in fact comprises a dye-receiving element and not a dye-donor element.

[0007] In JP-B-02/054798, a donor element is described for thermal wax transfer which has a magnetic ink layer or patch contiguous to a nonmagnetic thermal transfer layer or patch near the end position for the purpose of detecting the end position. In this element, the magnetic ink layer is coated on the ink side of the donor element and has the same color as the nonmagnetic ink layer next to it. A portion of the magnetic ink may also transfer to the receiving element during the printing process.

[0008] There is a problem with the format in this Japanese reference in that the magnetic layer or patch is limited to being located adjacent to an ink layer or patch. For certain types of information, it would be desirable to record information on other areas of a donor material, for example, in the same area as a dye patch. Also, in a thermal dye diffusion transfer process where only the dye is transferred, it would be desirable to not have any magnetic material be transferred to the receiving layer which would affect the density and color balance obtained.

[0009] It is an object of this invention to provide a dye-donor element for thermal dye transfer processing which contains a magnetic layer which can be in the same area as the dye layer. It is another object of the invention to provide a dye-donor element for thermal dye transfer processing which contains magnetic material but which is not transferred to the dye-receiving layer which would affect the density and color balance obtained.

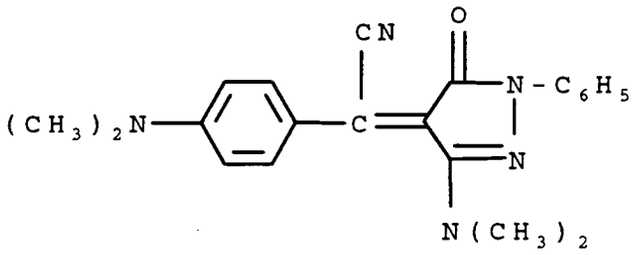
[0010] These and other objects are achieved in accordance with the invention which relates to a dye-donor element for thermal dye transfer comprising a support having on one side thereof a dye layer and on the other side thereof in the direct opposite area to at least a portion of the dye layer, a magnetic recording layer and a slipping layer, in that order.

[0011] The magnetic recording layer used in this invention can comprise a ferromagnetic oxide such as gamma Fe_2O_3, gamma Fe_2O_3 having a cobalt surface treatment, magnetite, magnetite having a cobalt surface treatment, barium ferrite, chromium dioxide, or a ferromagnetic metal particle such as metallic iron or metallic iron alloys with cobalt, nickel, chromium, etc. All of the above particles may also have a surface treatment with silica, alumina or an aluminosilicate to improve dispersability, corrosion and abrasion resistance. In a preferred embodiment of the invention, gamma Fe_2O_3 having a cobalt surface treatment is used.

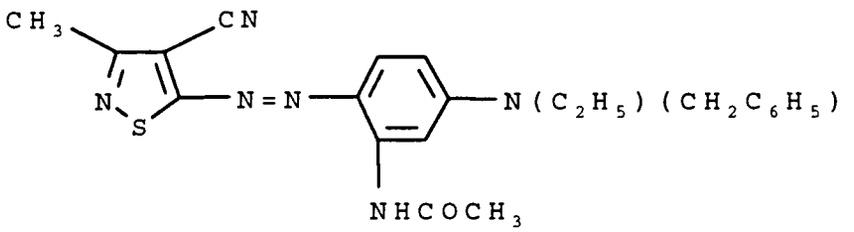
[0012] The above particles may have a coercivity of from about 23.88 kA/m (300 Oersted) to about 119.4 kA/m (1500 Oersted), preferably from about 47.76 kA/m (600 Oersted) to about 71.64 kA/m (900 Oersted).

[0013] The magnetic recording layer of the invention may be present in any concentration which is effective for the intended purpose. In general, good results have been attained using a laydown of from 0.01 g/m^2 to 4 g/m^2, preferably 0.04 g/m^2 to 0.1 g/m^2.

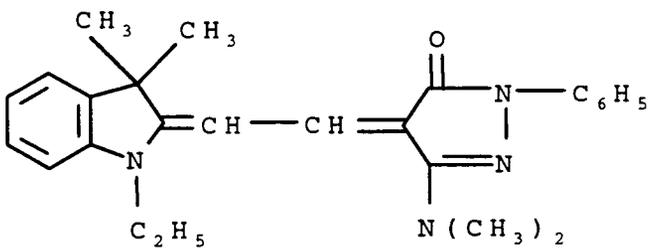
[0014] Any dye can be used in the dye layer of the dye-donor element of the invention provided it is transferable to the dye-receiving layer by the action of heat. Especially good results have been obtained with sublimable dyes such as



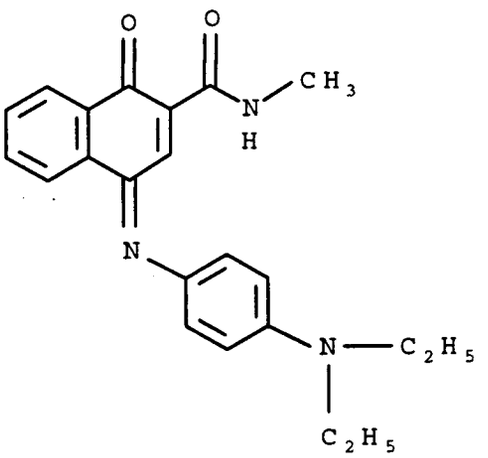
Magenta Dye M-1



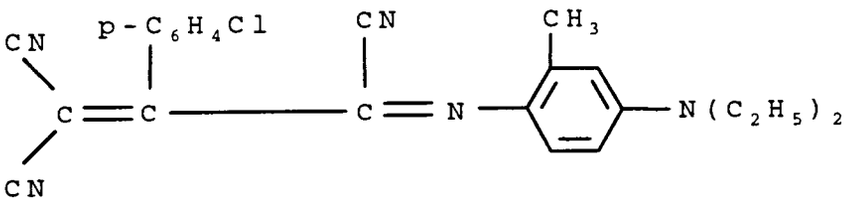
Magenta Dye M-2



Yellow Dye Y-1



Cyan Dye C-1



Cyan Dye C-2

or any of the dyes disclosed in U.S. Patent 4,541,830. The above dyes may be employed singly or in combination to obtain a monochrome. The dyes may be used at a coverage of from about 0.05 to about 1 g/m^2 and are preferably hydrophobic.

[0015] A dye-barrier layer may be employed in the dye-donor elements of the invention to improve the density of the transferred dye. Such dye-barrier layer materials include hydrophilic materials such as those described and claimed in U.S. Patent No. 4,716,144.

[0016] The dye layer of the dye-donor element may be coated on the support or printed thereon by a printing technique such as a gravure process.

[0017] Any slipping layer may be used in the dye-donor element of the invention to prevent the printing head from sticking to the dye-donor element. Such a slipping layer would comprise either a solid or liquid lubricating material or mixtures thereof, with or without a polymeric binder or a surface-active agent. Preferred lubricating materials include oils or semi-crystalline organic solids that melt below 100°C such as poly(vinyl stearate), beeswax, perfluorinated alkyl ester polyethers, poly(caprolactone), silicone oil, poly(tetrafluoroethylene), carbowax, poly(ethylene glycols), or any of those materials disclosed in U. S. Patents 4,717,711; 4,717,712; 4,737,485; and 4,738,950. Suitable polymeric binders for the slipping layer include poly(vinyl alcohol-co-butyral), poly(vinyl alcohol-co-acetal), poly(styrene), poly(vinyl acetate), cellulose acetate butyrate, cellulose acetate propionate, cellulose acetate or ethyl cellulose.

[0018] The amount of the lubricating material to be used in the slipping layer depends largely on the type of lubricating material, but is generally in the range of about 0.001 to about 2 g/m^2. If a polymeric binder is employed, the lubricating material is present in the range of 0.05 to 50 weight %, preferably 0.5 to 40 weight %, of the polymeric binder employed.

[0019] Any material can be used as the support for the dye-donor element of the invention provided it is dimensionally stable and can withstand the heat of the thermal printing heads. Such materials include polyesters such as poly(ethylene terephthalate); polyamides; polycarbonates; glassine paper; condenser paper; cellulose esters such as cellulose acetate; fluorine polymers such as polyvinylidene fluoride or poly(tetrafluoroethylene-co-hexafluoropropylene); polyethers such as polyoxymethylene; polyacetals; polyolefins such as polystyrene, polyethylene, polypropylene or methyl-

pentene polymers; and polyimides such as polyimide amides and polyetherimides. The support generally has a thickness of from about 2 to about 30 μm.

[0020] The dye-receiving element that is used with the dye-donor element of the invention usually comprises a support having thereon a dye image receiving layer. The support may be a transparent film such as a poly(ether sulfone), a polyimide, a cellulose ester such as cellulose acetate, a poly(vinyl alcohol-co-acetal) or a poly(ethylene terephthalate). The support for the dye-receiving element may also be reflective such as baryta-coated paper, polyethylene-coated paper, white polyester (polyester with white pigment incorporated therein), an ivory paper, a condenser paper or a synthetic paper such as DuPont Tyvek®.

[0021] The dye image-receiving layer may comprise, for example, a polycarbonate, a polyurethane, a polyester, poly(vinyl chloride), poly(styrene-co-acrylonitrile), polycaprolactone or mixtures thereof. The dye image-receiving layer may be present in any amount which is effective for the intended purpose. In general, good results have been obtained at a concentration of from about 1 to about 5 g/m^2.

[0022] As noted above, the dye-donor elements of the invention are used to form a dye transfer image. Such a process comprises imagewise heating a dye-donor element as described above and transferring a dye image to a dye receiving element to form the dye transfer image.

[0023] The dye-donor element of the invention may be used in sheet form or in a continuous roll or ribbon. If a continuous roll or ribbon is employed, it may have only one dye or may have alternating areas of other different dyes, such as sublimable cyan and/or magenta and/or yellow and/or black or other dyes. Such dyes are disclosed in U.S. Patent Nos. 4,541,830; 4,698,651; 4,695,287; 4,701,439; 4,757,046; 4,743,582; 4,769,360 and 4,753,922. Thus, one-, two-, three- or four-color elements (or higher numbers also) are included within the scope of the invention.

[0024] In a preferred embodiment of the invention, the dye-donor element comprises a poly(ethylene terephthalate) support coated with sequential repeating areas of yellow, cyan and magenta dye, and the above process steps are sequentially performed for each color to obtain a three-color dye transfer image. Of course, when the process is only performed for a single color, then a monochrome dye transfer image is obtained.

[0025] Thermal printing heads which can be used to transfer dye from the dye-donor elements of the invention are available commercially.

[0026] A thermal dye transfer assemblage of the invention comprises

(a) a dye-donor element as described above, and

(b) a dye-receiving element as described above, the dye receiving element being in a superposed relationship with the dye donor element so that the dye layer of the donor element is in contact with the dye image-receiving layer of the receiving element.

[0027] The above assemblage comprising these two elements may be preassembled as an integral unit when a monochrome image is to be obtained. This may be done by temporarily adhering the two elements together at their margins. After transfer, the dye-receiving element is then peeled apart to reveal the dye transfer image.

[0028] When a three-color image is to be obtained, the above assemblage is formed on three occasions during the time when heat is applied by the thermal printing head. After the first dye is transferred, the elements are peeled apart. A second dye-donor element (or another area of the donor element with a different dye area) is then brought in register with the dye-receiving element and the process is repeated. The third color is obtained in the same manner.

[0029] The following examples are provided to illustrate the invention.

Example 1

[0030] A dye-donor element was prepared by coating on each side of a 6 μm poly(ethylene terephthalate) support a subbing layer of titanium alkoxide (DuPont Tyzor TBT)® (0.13 g/m^2) from a n-propyl acetate and n-butyl alcohol solvent mixture.

[0031] The dye formulations listed below were than patch-coated on one side of the above support:

Yellow layer

[0032]

0.26 g/m^2 Y-1 (see above)
0.27 g/m^2 CAP-1 (20 s viscosity cellulose acetate propionate, Eastman Chemical Co.)
0.07 g/m^2 CAP-2 (5 s viscosity cellulose acetate propionate, Eastman Chemical Co.)
0.01 g/m^2 S363 N-1 (a micronized blend of polyethylene, polypropylene, and oxidized polyethylene particles, Shamrock Technologies, Inc.)

0.002 g/m^2 FC-430 (a fluorocarbon surfactant from 3M Co.)
solvent: toluene/methanol/cyclopentanone (66.5:28.5:5)

Magenta layer

[0033]

0.15 g/m^2 M-1 (see above)
0.14 g/m^2 M-2 (see above)
0.24 g/m^2 CAP-1
0.08 g/m^2 CAP-2
0.01 g/m^2 S363 N-1
0.002 g/m^2 FC-430
same solvent as used for coating yellow layer

Cyan layer

[0034]

0.38 g/m^2 C-1
0.11 g/m^2 C-2
0.34 g/m^2 CAP-1
0.01 g/m^2 S363 N-1
0.002 g/m^2 FC-430
same solvent as used for coating yellow layer

[0035] Two test samples E-1 and E-2 were prepared by coating a magnetic layer on the back side (opposite to the dye side) of the above donor support. The magnetic coatings were prepared by blending a dispersion of magnetic particles and a dispersion of an abrasive or polishing powder. The procedures for making these dispersions are described below.

Preparation of Magnetic Dispersion

[0036]

1) A high solids grind was obtained by milling CSF-4085V2, cobalt surface-treated γ-Fe_2O_3 particles obtained from Toda Kogyo Corp., having a nominal coercivity of 68 kA/m (850 Oersted), in a low-boiling solvent, di-n-butyl phthalate, and a wetting aid or dispersant (GAFAC® PE-510 organic phosphate surfactant from GAF Corp.) in a 250 cc capacity Eiger mill. The grind was at 35% solids (33.3% magnetic particles CSF 4085V2, 1.67% GAFAC® PE510) and 65% di-n-butyl phthalate. The mill was loaded with 90% V/V 1.0 mm Chromanite steel media, run at 4,000 rev/min with 10°C coolant for 5 hrs.
2) The high solids grind from 1) above was then diluted as follows:

2.0% cellulose triacetate
2.0% magnetic dispersion
0.1% GAFAC® PE-510
4.0% di-n-butyl phthalate
91.9% methylene chloride

using a 4% cellulose triacetate solution in methylene chloride and blending in the remaining material.

Preparation of Abrasive Dispersion

[0037] In a 1-gallon glass jar with seal cap, approximately 2,200 g Zr silicate 1.0-1.2 mm diameter mill media was added. Over a hot water bath, 7.5g Solsperse® 2400 (a dispersant available from Zeneca, Ltd.) was dissolved in 75g of methyl acetoacetate. This was added to the jar containing the mill media together with 367.5g methyl acetoacetate, 150g of AKP-50 (α-alumina, particle size ~ 0.25 μm, obtained from Sumitomo Chemical Corp.) and the jar sealed and placed on a roller mill at 100 rev/min for 24 hrs. The median particle size of the abrasive alumina was in the range of

0.2 to 0.3 μm and the material had an equivalent specific surface area of 9-11 g/m^2. The dispersion was separated from the mill media by screening.

[0038] Coating formulations prepared with the above dispersions were as follows:

E-1		
MATERIAL	% SOLIDS	AIM COVERAGE (g/m^2)
cellulose diacetate	2.90	0.94
magnetic dispersion	0.18	0.06
cellulose triacetate	0.18	0.06
FC-431*	0.015	0.05
Solsperse® 24000	0.0234	0.08

* FC-431 (a fluorocarbon surfactant from 3M Corp.)

E-2		
MATERIAL	% SOLIDS	AIM COVERAGE (g/m^2)
cellulose diacetate	2.90	0.94
magnetic dispersion	0.18	0.06
cellulose triacetate	0.18	0.06
dibutyl phthalate	0.349	0.12
GAFAC® PE-510	0.009	0.003
FC-431	0.015	0.05
Solsperse® 24000	0.0025	0.07
abrasive dispersion	0.050	0.02

[0039] Test sample E-1 was then provided with a slipping layer of the following composition (coated over the magnetic layer):

0.48 g/m^2 KS-1 poly(vinyl acetal) from Sekisui Chemical Corp.
0.0003 g/m^2 p-toluenesulfonic acid
0.01 g/m^2 PS513® aminopropyl-dimethyl-terminated polydimethylsiloxane, (Petrarch Systems, Inc.)
0.07 g/m^2 of a copolymer of poly(propylene oxide) and poly(methyl octyl siloxane), BYK-S732® (98 % in Stoddard solvent) (Byk Chemie) from an 80:20 3-butanone/methanol solvent mixture.

[0040] Test sample E-2 was not provided with a slipping layer.

[0041] A comparative control sample C-1 was prepared by coating the same support, dye and slipping layers of test sample E-1, but omitting the magnetic backcoat.

Example 2

[0042] Writeability/readability tests of the magnetic layers of test samples E-1 and E-2 were performed on a Honeywell 7600 reel-to-reel transport at a speed of 4.8 cm/sec. Spin Physics Instrumentation heads were used with track-widths of 1.25 mm and 2.5 μm gaps. The recording head was wound with 90 turns and the reading head with 480 turns. The output signal from the reading head was amplified by a 70 dB gain low-noise preamplifier and filtered by a 4-pole

Butterworth filter with a bandwidth of 7.5 kHz. Characterization of the output signal was performed using a LeCroy 9314L digital oscilloscope. The magnetic recording results are shown as follows:

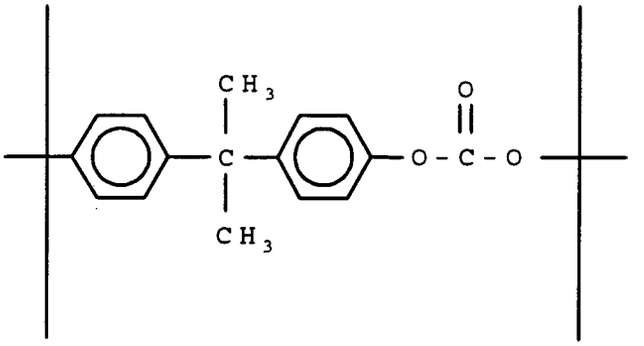
TABLE 1

Parameter	E-1 with slipping layer	E-2 without slipping layer
Optimum record current @ density of 80 flux transitions/mm	29 mA	24 mA
Isolated Pulse Width	5.43 μm	4.93 μm
Output Voltage	48.1 μvolt	51.4 μvolt

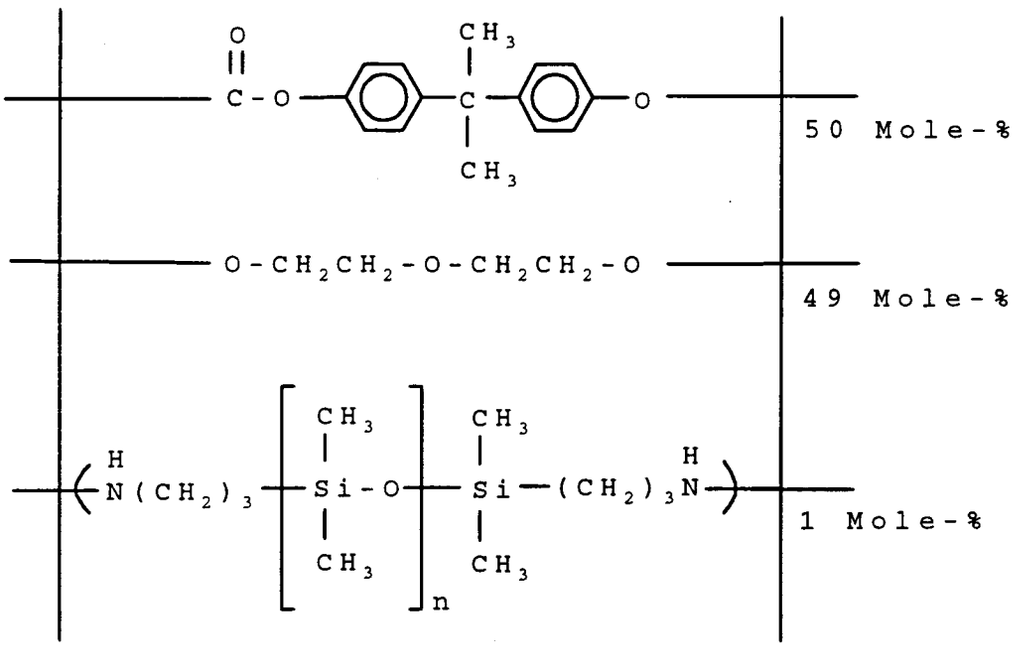
[0043] The above results show that even though the slipping layer degrades the magnetic recording performance to some extent, the medium is still capable of supporting low-density (20-30 bits/mm or >600 bits/inch) information.

Example 3

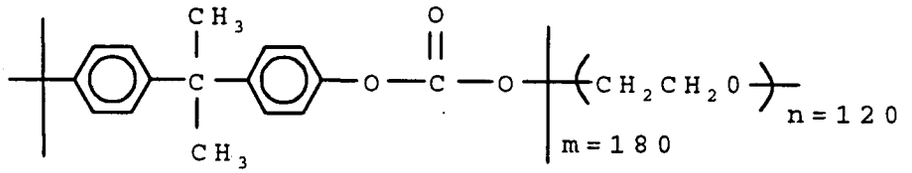
[0044] To evaluate printing performance of donor elements according to the present invention, polycarbonate dye receivers were prepared using the following materials:



LEXAN® 141 (a bisphenol A polycarbonate available from General Electric Co.)



K-polycarbonate, a random terpolymer made in-house from bisphenol A, diethylene glycol, and PS510 (a polydimethylsiloxane available from Huels America)



KL3-1013 a polyether-modified bisphenol A polycarbonate available from Bayer AG)

[0045] A receiver element was prepared by applying a subbing layer of 0.11 g/m^2 of Dow Z-6020 (a water-soluble aminoalkyl-alkoxysilane available from Dow Chemical Co.) in 3A alcohol to a support of a microvoided polypropylene layer laminated onto a white reflective support of titanium dioxide-pigmented polyethylene-overcoated paper stock. A receiving layer of the following composition was coated onto the subbing layer:

1.46 g/m^2 Lexan® 141
1.78 g/m^2 KL3-1013
0.01 g/m^2 FC-431
0.32 g/m^2 dibutyl phthalate
0.32 g/m^2 methylene chloride

[0046] Subsequently, the following overcoat layer was applied to the receiving layer:

0.22 g/m^2 K-polycarbonate
0.008 g/m^2 DC-510 (a silicone fluid surfactant from Dow-Corning
0.02 g/m^2 FC-431

from methylene chloride solvent.

[0047] For printing evaluation of E-1 and C-1, the dye side of the dye-donor element strip approximately 10 cm x 13 cm in area was placed in contact with the dye image-receiving element of the same area. The assemblage was clamped to a stepper-motor driven 60 mm diameter rubber roller, and a TDK Thermal Head (no. L-231) (thermostated at 26°C) was pressed with a force of 36 newtons against the dye-donor element side of the assemblage pushing it against the rubber roller.

[0048] The imaging electronics were activated causing the donor/receiver assemblage to be drawn between the printing head and roller at 6.9 mm/s. Coincidentally, the resistive elements in the thermal print head were pulsed for 29 μs/pulse at 128 μs intervals during the 33 msec/dot printing time. An image was generated with regions of varying density by setting the number of pulses/dot for a particular density at a set value between 0 to 255. The voltage supplied to the print head was approximately 23.5 volts, resulting in an instantaneous peak power of 1.3 watts/dot and a maximum total energy of 9.6 mjoules/dot.

[0049] The dye transfer element was separated from the receiving element immediately after passing the thermal head. The receiver element was then backed up and the position reinitialized under the head and printed again with the next color. In this way a full color (YMC) image was obtained. The print quality was good in all cases and there were no sticking problems at the donor/thermal head interface.

[0050] The Status A densities of the images were measured on an X-Rite densitometer (X-Rite Corp., Grandville, MI) and are as follows:

Table 2

Energy (mJ/dot)	Yellow		Magenta		Cyan	
	C-1	E-1	C-1	E-1	C-1	E-1
0	0.11	0.10	0.12	0.11	0.11	0.10
1.1	0.11	0.10	0.12	0.11	0.11	0.11

Table 2 (continued)

Energy (mJ/dot)	Yellow		Magenta		Cyan	
	C-1	E-1	C-1	E-1	C-1	E-1
2.1	0.11	0.10	0.12	0.11	0.11	0.11
3	0.14	0.12	0.15	0.12	0.14	0.12
4	0.36	0.31	0.34	0.30	0.32	0.30
4.9	0.55	0.50	0.50	0.47	0.46	0.42
5.8	0.3	0.69	0.67	0.64	0.61	0.58
6.8	0.96	0.91	0.87	0.84	0.81	0.79
7.7	1.23	1.20	1.16	1.12	1.07	1.05
8.7	1.58	1.57	1.54	1.49	1.40	1.35
9.6	1.99	1.97	2.40	1.96	1.80	1.74

[0051] The above results indicate that the addition of a magnetic layer to the opposite side of the dye-donor element in accordance with the invention does not have any appreciable effect on the density of the transferred image.

Claims

1. A dye-donor element for thermal dye transfer comprising a support having on one side thereof a dye layer and on the other side thereof in the direct opposite area to at least a portion of said dye layer, a magnetic recording layer and a slipping layer, in that order.

2. The element of Claim 1 wherein said magnetic recording layer is present at a concentration of from 0.01 to 4 g/m^2.

3. The element of Claim 1 wherein said magnetic material is a ferromagnetic oxide or a ferromagnetic metal particle.

4. The element of Claim 1 wherein said magnetic material is gamma Fe_2O_3 having a cobalt surface treatment.

5. A process of forming a dye transfer image comprising:

   (a) imagewise-heating a dye-donor element comprising a support having on one side thereof a dye layer and on the other side thereof in the direct opposite area to at least a portion of said dye layer, a magnetic recording layer and a slipping layer, in that order, and
   (b) transferring a dye image to a dye-receiving element to form said dye transfer image.

6. The process of Claim 5 wherein said magnetic recording layer is present at a concentration of from 0.01 to 4 g/m^2.

7. The process of Claim 5 wherein said magnetic material is a ferromagnetic oxide or a ferromagnetic metal particle.

8. The process of Claim 5 wherein said magnetic material is gamma Fe_2O_3 having a cobalt surface treatment.

9. A thermal dye transfer assemblage comprising

   (a) a dye-donor element comprising a support having on one side thereof a dye layer and on the other side thereof in the direct opposite area to at least a portion of said dye layer, a magnetic recording layer and a slipping layer, in that order, and
   (b) a dye-receiving element comprising a support having thereon a dye image-receiving layer,

   said dye-receiving element being in a superposed relationship with said dye-donor element so that said dye layer is in contact with said dye image-receiving layer.

10. The assemblage of Claim 9 wherein said magnetic recording layer is present at a concentration of from 0.01 to 4 g/m^2.

Patentansprüche

1. Farbstoff-Donorelement fir die thermische Farbstoffübertragung mit einem Träger, auf dessen einer Seite sich eine Farbstoffschicht befindet und auf dessen anderer Seite sich in dem direkt gegenüberliegenden Bereich zu mindestens einem Teil der Farbstoffschicht eine magnetische Aufzeichnungsschicht und eine Gleitschicht, in dieser Reihenfolge, befinden.

2. Element nach Anspruch 1, in dem die magnetische Aufzeichnungsschicht in einer Konzentration von 0,01 bis 4 g/m^2 vorliegt.

3. Element nach Anspruch 1, in dem das magnetische Material ein ferromagnetisches Oxid oder ein ferromagnetisches Metallteilchen ist.

4. Element nach Anspruch 1, in dem das magnetische Material Gamma-Fe_2O_3 mit einer Cobalt-Oberflächenbehandlung ist.

5. Verfahren zur Herstellung eines Farbstoff-Übertragungsbildes, bei dem man:

   (a) ein Farbstoff-Donorelement mit einem Träger, auf dessen einer Seite sich eine Farbstoffschicht befindet und auf dessen anderer Seite sich in dem direkt gegenüberliegenden Bereich zu mindestens einem Teil der Farbstoffschicht eine magnetische Aufzeichnungsschicht und eine Gleitschicht in dieser Reihenfolge befinden, bildweise erhitzt, und bei dem man

   (b) ein Farbstoffbild auf ein Farbstoff-Empfangselement überträgt, unter Erzeugung des Farbstoff-Übertragungsbildes.

6. Verfahren nach Anspruch 5, bei dem die magnetische Aufzeichnungsschicht in einer Konzentration von 0,01 bis 4 g/m^2 vorliegt.

7. Verfahren nach Anspruch 5, bei dem das magnetische Material ein ferromagnetisches Oxid oder ein ferromagnetisches Metallteilchen ist.

8. Verfahren nach Anspruch 5, bei dem das magnetische Material Gamma-Fe_2O_3 mit einer Cobalt-Oberflächenbehandlung ist.

9. Zusammenstellung für die thermische Farbstoffübertragung mit

   (a) einem Farbstoff-Donorelement mit einem Träger, auf dessen einer Seite sich eine Farbstoffschicht befindet und auf dessen anderer Seite sich in dem direkt gegenüberliegenden Bereich zu mindestens einem Teil der Farbstoffschicht eine magnetische Aufzeichnungsschicht und eine Gleitschicht in dieser Reihenfolge befinden, und

   (b) einem Farbstoff-Empfangselement mit einem Träger, auf dem sich eine Farbbild-Empfangsschicht befindet, wobei sich das Farbstoff-Empfangselement in übergeordneter Beziehung zu dem Farbstoff-Donorelement befindet, derart, daß die Farbstoffschicht in Kontakt mit der Farbbild-Empfangsschicht gelangt.

10. Zusammenstellung nach Anspruch 9, in der die magnetische Aufzeichnungsschicht in einer Konzentration von 0,01 bis 4 g/m^2 vorliegt.

Revendications

1. Elément donneur de colorant utilisé dans le transfert de colorant par la chaleur comprenant un support recouvert, sur une face, d'une couche de colorant et sur l'autre face dans la zone directement opposée à au moins une partie de ladite couche de colorant, d'une couche d'enregistrement magnétique et d'une couche favorisant le glissement, dans cet ordre.

2. Elément selon la revendication 1, dans lequel ladite couche d'enregistrement magnétique est présente selon une concentration comprise entre 0,01 et 4 g/m^2.

3. Elément selon la revendication 1, dans lequel ladite substance magnétique est un oxyde ferromagnétique ou une particule métallique ferromagnétique.

4. Elément selon la revendication 1, dans lequel ladite substance magnétique est du gamma Fe_2O_3 ayant reçu un traitement superficiel au cobalt.

5. Procédé de formation d'une image par transfert de colorant comprenant les étapes suivantes :

a) chauffer, en conformité avec l'image, un élément donneur de colorant comprenant un support recouvert, sur une face, d'une couche de colorant et sur l'autre face dans la zone directement opposée à au moins une partie de ladite couche de colorant, d'une couche d'enregistrement magnétique et d'une couche favorisant le glissement, dans cet ordre, et
b) transférer l'image de colorant sur un élément récepteur de colorant pour former ladite image par transfert de colorant.

6. Procédé selon la revendication 5, dans lequel ladite couche d'enregistrement magnétique est présente selon une concentration comprise entre 0,01 et 4 g/m^2.

7. Procédé selon la revendication 5, dans lequel ladite substance magnétique est un oxyde ferromagnétique ou une particule métallique ferromagnétique.

8. Procédé selon la revendication 5, dans lequel ladite substance magnétique est du gamma Fe_2O_3 ayant reçu un traitement superficiel au cobalt.

9. Assemblage pour le transfert de colorant par la chaleur comprenant

(a) un élément donneur de colorant comprenant un support recouvert, sur une face, d'une couche de colorant et sur l'autre face dans la zone directement opposée à au moins une partie de ladite couche de colorant, d'une couche d'enregistrement magnétique et d'une couche favorisant le glissement, dans cet ordre, et
(b) un élément récepteur de colorant comprenant un support recouvert d'une couche réceptrice d'image de colorant, ledit élément récepteur de colorant étant superposé audit élément donneur de colorant, de manière que ladite couche de colorant soit en contact avec ladite couche réceptrice d'image de colorant.

10. Assemblage selon la revendication 9, dans lequel ladite couche d'enregistrement magnétique est présente selon une concentration comprise entre 0,01 et 4 g/m^2.