

Title (en)

MODIFICATION OF POLYMER OPTOELECTRONIC PROPERTIES AFTER FILM FORMATION IMPURITY ADDITION OR REMOVAL

Title (de)

ÄNDERUNG DER OPTOELEKTRONISCHEN EIGENSCHAFTEN EINES POLYMERS NACH DER BILDUNG EINER DÜNSCHICHT, DER ZUGABE ODER ENTFERNUNG VON VERUNREINIGUNGEN

Title (fr)

MODIFICATION DES PROPRIETES OPTOELECTRONIQUES D'UN POLYMERE APRES FORMATION D'UNE COUCHE MINCE PAR ADDITION OU ELIMINATION D'IMPURETES

Publication

EP 1101244 A4 20040331 (EN)

Application

EP 99918499 A 19990412

Priority

- US 9907970 W 19990412
- US 8149298 P 19980413

Abstract (en)

[origin: WO9953529A2] The methods of this invention involve modification of the properties of an organic film after it has been deposited by either adding new components into it from its top or bottom surface, or by causing components to leave the film from its top or bottom surface. In the examples of these methods, the emitting color of light-emitting diodes are modified based on doped polymers by locally introducing dopants causing different color emission into the film by local application of a solution containing the desired dopant to the film surface (by ink jet printing, screen printing, local droplet application, etc.). This overcomes difficulties encountered with the direct patterning of three separately formed organic layers (each which uniformly coats an entire surface when formed) into regions for separate R, G, and B devices due to the sensitivities of the organic materials to chemicals typically used with conventional patterning technologies. Alternatively, dopants may be introduced in an organic film by diffusion from one layer into the film. Alternatively, dopants may be selectively removed from a film with solvents, etc.

[origin: WO9953529A2] The methods of this invention involve modification of an organic film after it has been deposited by either adding new dopants into it from top or bottom surface, or by causing dopants to leave the film from its top or bottom surface. In the examples of these methods, the emitting color of light emitting diodes are modified based on doped polymers by locally introducing dopants causing different color emission into the film by local application of a solution containing desired dopant to the film surface (by ink-jet printing, screen printing, local droplet application, etc.). This covers the difficulties of encountered with direct patterning of three separately formed organic layers (each which uniformly coats an entire surface when formed) into regions for separate R, G, and B devices due to sensitivities of the organic materials to chemicals typically used with conventional patterning technologies. Alternatively, dopants may be introduced in an organic film (16) by diffusion from one layer (18, 19) into the film (16). Alternatively, dopants may be selectively removed from a film with solvents, etc.

IPC 1-7

H01L 51/20; **H01L 21/225**

IPC 8 full level

H05B 33/10 (2006.01); **H01L 27/15** (2006.01); **H05B 33/12** (2006.01); **H10K 99/00** (2023.01)

CPC (source: EP KR)

H05B 33/14 (2013.01 - KR); **H10K 50/00** (2023.02 - KR); **H10K 50/125** (2023.02 - EP); **H10K 71/30** (2023.02 - EP); **H10K 71/12** (2023.02 - EP); **H10K 85/146** (2023.02 - EP); **H10K 85/60** (2023.02 - EP)

Citation (search report)

- [Y] CHAKRAVORTY K K: "ULTRAVIOLET DEFINED SELECTIVE IN-DIFFUSION OF ORGANIC DYES IN POLYIMIDE FOR APPLICATIONS IN OPTICAL INTERCONNECTION TECHNOLOGY", 7 September 1992, APPLIED PHYSICS LETTERS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, PAGE(S) 1163-1165, ISSN: 0003-6951, XP000296379
- [Y] GAUTIER E ET AL: "BLUE LIGHT-EMITTING DIODES WITH DOPED POLYMERS", SYNTHETIC METALS, ELSEVIER SEQUOIA, LAUSANNE, CH, vol. 81, 1996, pages 197 - 200, XP000858278, ISSN: 0379-6779
- [PA] SHOUSTIKOV A A ET AL: "ELECTROLUMINESCENCE COLOR TUNING BY DYE DOPING IN ORGANIC LIGHT-EMITTING DIODES", IEEE JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS, IEEE SERVICE CENTER, US, vol. 4, no. 1, 1998, pages 3 - 13, XP000766104, ISSN: 1077-260X
- [A] YANG YANG ET AL: "POLYMER LIGHT-EMITTING LOGOS PROCESSED BY THE INK-JET PRINTING TECHNOLOGY", PROCEEDINGS OF THE SPIE, SPIE, BELLINGHAM, VA, US, vol. 3279, January 1998 (1998-01-01), pages 78 - 86, XP000828138, ISSN: 0277-786X
- [A] MCCARTHY O ET AL: "SELECTIVE-AREA DOPING OF POROUS SOLGEL FILMS FOR INTEGRATED OPTICS", 15 December 1997, OPTICS LETTERS, OPTICAL SOCIETY OF AMERICA, WASHINGTON, US, PAGE(S) 1864-1866, ISSN: 0146-9592, XP000733988
- [PX] HEBNER T R ET AL: "LOCAL TUNING OF ORGANIC LIGHT-EMITTING DIODE COLOR BY DYE DROPLET APPLICATION", APPLIED PHYSICS LETTERS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 73, no. 13, 28 September 1998 (1998-09-28), pages 1775 - 1777, XP000784155, ISSN: 0003-6951
- [PX] PSCHENITZKA F ET AL: "THREE-COLOR ORGANIC LIGHT-EMITTING DIODES PATTERNED BY MASKED DYE DIFFUSION", APPLIED PHYSICS LETTERS, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 74, no. 13, 29 March 1999 (1999-03-29), pages 1913 - 1915, XP000827172, ISSN: 0003-6951

Designated contracting state (EPC)

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

DOCDB simple family (publication)

WO 9953529 A2 19991021; **WO 9953529 A3 20000720**; AU 3639999 A 19991101; EP 1101244 A1 20010523; EP 1101244 A4 20040331; JP 2002511637 A 20020416; KR 20010042689 A 20010525

DOCDB simple family (application)

US 9907970 W 19990412; AU 3639999 A 19990412; EP 99918499 A 19990412; JP 2000543997 A 19990412; KR 20007011393 A 20001013