



- (51) **International Patent Classification:**
G11B 7/004 (2006.01) *G11B 7/24* (2006.01)
- (21) **International Application Number:**
PCT/US2012/041870
- (22) **International Filing Date:**
11 June 2012 (11.06.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/494,966 9 June 2011 (09.06.2011) US
- (71) **Applicant (for all designated States except US):** **CASE WESTERN RESERVE UNIVERSITY** [US/US]; 10900 Euclid Avenue, Cleveland, OH 44106 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **SINGER, Kenneth, D.** [US/US]; 29450 Edgedale Road, Pepper Pike, OH 44124 (US). **RYAN, Chris** [US/US]; 3230 Brady Lake Road, Ravenna, OH 44266 (US). **SHAN, Jie** [US/US]; 2402 Overlook Road, Cleveland Heights, OH 44106 (US). **LOTT, Joseph** [US/US]; 7333 Gallagher Drive, Edina, MN 55435 (US). **WEDER, Christophe** [SE/SE]; Alpenweg 4, CH-31 86 Duedingen (CH). **VALLE, Brent** [US/US]; 2125 Coventry Road, Cleveland Heights, OH 44118 (US). **BAER, Eric** [US/US]; 2 Morning Lane, Cleveland Heights, OH 44106 (US).
- (74) **Agent:** **SUTKUS, Richard, A.**; Tarolli, Sundheim, Covell & Tummino LLP, 1300 East Ninth Street, Suite 1700, Cleveland, OH 44114 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— with international search report (Art. 21(3))
- (88) **Date of publication of the international search report:**
2 May 2013

(54) **Title:** OPTICAL INFORMATION STORAGE MEDIUM

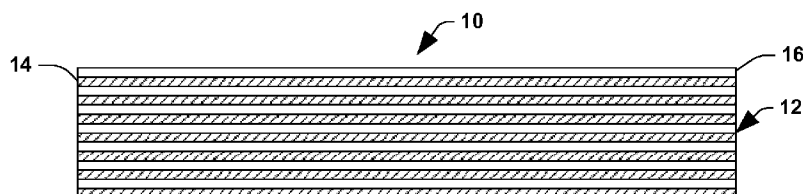


Fig. 1

(57) **Abstract:** An optical information storage medium includes a multilayer film that includes a plurality of extruded alternating active data storage layers and buffer layers, which separate the active data storage layers. The active data storage layers and buffer layers have thicknesses that allow the active data storage layers to be writable by permanent or reversible one- or multiphoton, linear, nonlinear, or threshold optical writing processes to define data voxels within the active data storage layers that are readable by an optical reading device.



A. CLASSIFICATION OF SUBJECT MATTER**G11B 7/004(2006.01)i, G11B 7/24(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G11B 7/004; B32B 3/02; G01T 1/00; G03F 7/00; G11B 7/0045

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: optical, medium, disk, disc, multi, layer, buffer, active

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007-0154674 A1 (STANLEY C. BUSMAN et al.) 05 July 2007 See the abstract, paragraphs 4, 15-20, figure. 3.	1,4-6,11,13,14,16 ,19,20,26-28,30,33 ,34,39-41,43,46-48 ,53-55,58-60,65 ,67-69
Y		2,15,17,23,24,29 ,31,37,38,42,44,56
A		3,7-10,12,18,21,22 ,25,32,35,36,45 ,49-52,57,61-64,66
Y	JP 2009-093748 A (HITACHI COMPUTER PERIPHERALS CO LTD) 30 April 2009 See the abstract, paragraphs 1-15.	2,17,31,44,56
Y	WO 95-30909 A1 (GEORGETOWN UNIVERSITY) 16 November 1995 See the abstract.	15,29,42
Y	US 2008-0124661 A1 (GORE MAKARAND P.) 29 May 2008 See the abstract, paragraphs 12-38.	23,24,37,38



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

15 JANUARY 2013 (15.01.2013)

Date of mailing of the international search report

17 JANUARY 2013 (17.01.2013)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Soak, Sang Moon

Telephone No. 82-42-481-8470



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/041870

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007-0154674 A1	05.07.2007	None	
JP 2009-093748 A	30.04.2009	None	
WO 95-30909 A1	16.11.1995	EP 0826154 A1	04.03.1998
		EP 0826154 A1	15.04.1998
		EP 0826154 A4	04.03.1998
		JP 10-503588 A	31.03.1998
		JP 10-503588 T	31.03.1998
		JP H105-03588-03588	31.03.1998
		US 05319210A A	07.06.1994
		US 05498876A A	12.03.1996
		WO 94-11760 A1	26.05.1994
		WO 95-30909A1	16.11.1995
US 2008-0124661 A1	29.05.2008	CN 101432657 A	13.05.2009
		EP 2010962 A2	07.01.2009
		JP 2009-535235 A	01.10.2009
		KR 10-2009-0005211 A	12.01.2009
		US 2007-0248781 A1	25.10.2007
		US 7955682 B2	07.06.2011
		WO 2007-127229 A2	08.11.2007
		WO 2007-127229 A3	08.11.2007
		WO 2009-099861 A2	13.08.2009
		WO 2009-099861 A3	13.08.2009
		WO 2009-099861 A3	01.10.2009