

(51) International Patent Classification:
C23C 14/10 (2006.01)(21) International Application Number:
PCT/US2013/071653(22) International Filing Date:
25 November 2013 (25.11.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/731,226 29 November 2012 (29.11.2012) US
13/840,752 15 March 2013 (15.03.2013) US(71) Applicant: CORNING INCORPORATED [US/US]; 1
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lectual Property Department, SP-TI-03-1, Corning, New
York 14831 (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, BN, 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, IR, IS, JP, KE, KG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
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,
KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))

(88) Date of publication of the international search report:
24 July 2014

(54) Title: METHOD FOR FORMING A BARRIER LAYER

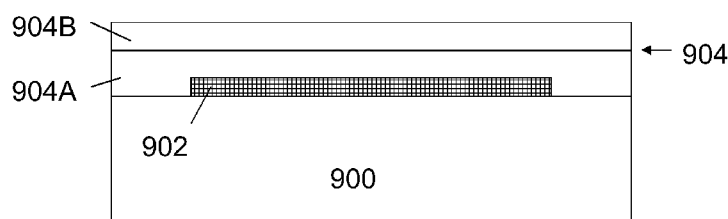


Fig. 10

(57) Abstract: A method of forming a hermetic barrier layer comprises sputtering a thin film from a sputtering target, wherein the sputtering target includes a sputtering material such as a low T_g glass, a precursor of a low T_g glass, or an oxide of copper or tin. During the sputtering, the formation of defects in the barrier layer are constrained to within a narrow range and the sputtering material is maintained at a temperature of less than 200°C.

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2013/071653

A. CLASSIFICATION OF SUBJECT MATTER
 INV. C23C14/10
 ADD.

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)
 C23C

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	VAN DER JAGT ET AL: "Sputter deposition of Ti ₂ SeAs ₂ Te ₃ chalcogenide glass", JOURNAL OF VACUUM SCIENCE & TECHNOLOGY A, vol. 4, no. 2, 1 March 1986 (1986-03-01), pages 203-209, XP001310446, US paragraph [00VI]	1-9
A	US 3 850 604 A (KLEIN R) 26 November 1974 (1974-11-26) column 4, line 16 - line 29	1-9
A	US 2012/028011 A1 (AN CHONG PYUNG [US] ET AL) 2 February 2012 (2012-02-02) paragraphs [0029] - [0036]	1-9



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 another 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

17 January 2014

Date of mailing of the international search report

23/05/2014

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/071653

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

2-8(completely); 1, 9(partially)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2013/071653

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3850604	A	26-11-1974	NONE

US 2012028011	A1	02-02-2012	CN 103025911 A 03-04-2013
			EP 2598667 A1 05-06-2013
			JP 2013539502 A 24-10-2013
			KR 20130037220 A 15-04-2013
			TW 201217556 A 01-05-2012
			US 2012028011 A1 02-02-2012
			WO 2012018487 A1 09-02-2012

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 2-8(completely); 1, 9(partially)

Sputtering methods with controlled target temperature.

2. claims: 10, 11, 13(completely); 1, 9, 14, 15(partially)

Method for sputtering tin compounds.

3. claims: 12(completely); 1, 14, 15(partially)

Method for sputtering copper oxide.
