



- (51) International Patent Classification:
C03C 21/00 (2006.01)
- (21) International Application Number:
PCT/US2014/042653
- (22) International Filing Date:
17 June 2014 (17.06.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/835,844 17 June 2013 (17.06.2013) US
- (71) Applicant: CORNING INCORPORATED [US/US]; 1 Riverfront Plaza, Corning, NY 14831 (US).
- (72) Inventors: AMIN, Jaymin; 234 Upper Delevan Avenue, Corning, NY 14830 (US). GROSS, Timothy, Michael; 452 Fulton Street, Waverly, NY 14892 (US). PETZOLD, Odessa, Natalie; 190 Bowlby Road, Elmira, NY 14901 (US). ROUSSEV, Rostislav, Vatchev; 6 Fox Lane West, Painted Post, NY 14870 (US).
- (74) Agent: PATEL, Payal, A.; Corning Incorporated, Intellectual Property Department, SP-TI-03-1, Corning, NY 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).

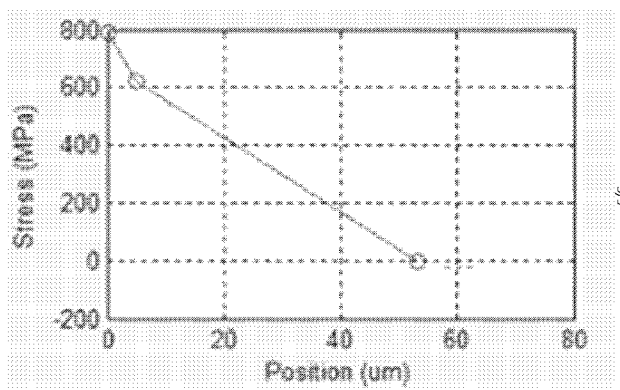
Published:

- 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:
26 February 2015

(54) Title: ANTIMICROBIAL GLASS ARTICLES WITH IMPROVED STRENGTH AND METHODS OF MAKING AND USING SAME

Figure 3A



(57) Abstract: Described herein are various antimicrobial glass articles that have improved strength and resistance to discoloration. The improved antimicrobial glass articles described herein generally include a glass substrate with a compressive stress layer and an antimicrobial silver-containing region that each extend inward from a surface of the glass substrate to a specific depth. In some embodiments, the compressive stress layer has a compressive stress at the surface of about 500 MPa or greater and the compressive stress decreases monotonically from the surface into the depth of the glass substrate. Methods of making and using the glass articles are also described and include forming a compressive stress layer and forming an antimicrobial silver-containing region by preferentially exchanging a plurality of silver cations in a silver-containing medium for a specific plurality of first cations ions in the glass substrate.



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/042653

A. CLASSIFICATION OF SUBJECT MATTER
INV. C03C21/00
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)
C03C

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	WO 2012/019067 A1 (CORNING INC [US]; BORRELLI NICHOLAS F [US]; MORSE DAVID LATHROP [US];) 9 February 2012 (2012-02-09) claim 1 paragraph [0010] - paragraph [0011] figure 4 claim 2	1-7,10, 11,13-15
X	JP 2011 133800 A (ASAHI GLASS CO LTD) 7 July 2011 (2011-07-07) claim 1 paragraph [0020] paragraph [0022] paragraph [0017] paragraph [0013]	1,2,7, 13-16, 18-20

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 2 October 2014	Date of mailing of the international search report 16/12/2014
---	--

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Saldamli, Saltuk
--	--

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/042653

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012019067	A1	09-02-2012	
		CN 103068764 A	24-04-2013
		EP 2601149 A1	12-06-2013
		JP 2013540673 A	07-11-2013
		KR 20130135837 A	11-12-2013
		US 2012034435 A1	09-02-2012
		US 2014072783 A1	13-03-2014
		WO 2012019067 A1	09-02-2012

JP 2011133800	A	07-07-2011	NONE
