PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	19.09.2017
Applicant's or agent's file reference 160469WO01	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/JP2017/026640	24.07.2017	29.07.2016

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

C03C4/08(2006.01)i, C03C3/23(2006.01)i, C03C3/247(2006.01)i, G02B5/22(2006.01)i

Applicant

AGC INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☐ Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2017/026640

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

a. ☐ forming part of the international application as filed:

☐ in the form of an Annex C/ST.25 text file.

☐ on paper or in the form of an image file.

b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

c. ☐ furnished subsequent to the international filing date for the purposes of international search only:

☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2017/026640

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	3, 5-10	YES
	Claims	1-2, 4, 11	NO
Inventive step (IS)	Claims		YES
	Claims	1-11	NO
Industrial applicability (IA)	Claims	1-11	YES
	Claims		NO

2. Citations and explanations:

Document 1: JP 9-202644 A (CARL-ZEISS-STIFTUNG) 05 August 1997, claim 1, paragraph [0001], table 1, fig. 1, examples 1, 2 & US 5750448 A, claim 1, column 1, lines 5-22, table 1, fig. 1, examples 1, 2 & EP 779253 A1 & DE 19546313 C1 & KR 10-0179319 B & TW 349081 B

Document 2: WO 2007/058185 A1 (ISUZU GLASS CO., LTD.) 24 May 2007, claim 1, paragraphs [0033]-[0038], [0044], [0045], [0055]-[0057], fig. 1 & JP 2007/058185 A1 & US 2009/0163343 A1 claim 1, paragraphs [0071]-[0076], [0082], [0083], [0093]-[0095], fig. 1 & EP 1953122 A1

Document 3: JP 2015-522500 A (CDGM GLASS CO., LTD.) 06 August 2015, claim 21, tables 3-5, fig. 1 & WO 2013/152629 A1 & CN 102923949 A & KR 10-2015-0005963 A

Document 4: JP 2014-12630 A (SCHOTT AG.) 23 January 2014, claim 8, paragraphs [0002], [0010], [0078], table 4, fig. 2 & US 2013/0344343 A1 claim 10, paragraphs [0004], [0012],

table 4, fig. 2 & DE 102012210552 A1 & KR 10-2014-0000166 A & CN 103508670 A & TW 201404757 A

Document 5: JP 2014-101255 A (NIPPON ELECTRIC GLASS CO., LTD.) 05 June 2014, paragraphs [0001]-[0005], [0037], [0056], tables 1, 2, fig. 1 (Family: none)

[I.] The invention as in claims 1-2, 4 and 11 of the present application lacks novelty and does not involve an inventive step in the light of document 1.

Document 1 discloses an optical filter which has absorption bands in the UV (ultraviolet) and IR (infrared) regions and which satisfies the optical characteristics set forth in claims 1-2 of the present application (claim 1, paragraph [0001], table 1, fig. 1, example 2). In addition, there is a high probability that the optical filter disclosed in document 1 (example 2) satisfies the optical characteristic set forth in claim 4 of the present application in view of the shape of the spectral transmittance curve of the optical filter (fig. 1).

Therefore, the invention as in claims 1-2, 4 and 11 of the present application is identical to the invention disclosed in document 1.

[II]. The invention as in claims 3 and 5-8 of the present application does not involve an inventive step in the light of documents 1 and 2.

Document 1 discloses an optical filter having absorption bands in the UV (ultraviolet) and IR (infrared) regions, which has a Cu content (cation%) of

approximately 4.3% and a Cl content (anion%) of approximately 0.26%, and which satisfies the optical characteristic set forth in claim 3 of the present application (claim 1, paragraph [0001], table 1, fig. 1, example 1).

In the optical filter disclosed in document 1 (example 1), the prescribed inclination set forth in claim 1 of the present application is not 3 or more. In addition, the optical filter disclosed in document 1 does not contain crystals of at least one type of copper halide selected from among CuCl, CuBr and CuI, and does not contain Ag as a cation component.

However, document 2 discloses an optical filter in which 0.01-10wt% of crystals of a copper halide (at least one type selected from among CuCl, CuBr and CuI) and 0.001-1wt% of silver (Ag) are incorporated in the optical filter in order to selectively and sharply block ultraviolet radiation while shifting wavelengths that are blocked in the ultraviolet region to longer wavelengths (claim 1, paragraphs [0033]-[0038], [0044], [0045], fig. 1). Furthermore, as methods for introducing copper halide crystals and silver, document 2 discloses cooling a glass of raw material at a cooling rate of approximately 10-100 °C/hr and heat treating at approximately 450-700 °C (paragraphs [0055]-[0057]).

Therefore, a person skilled in the art could easily have incorporated the copper halide and Ag by carrying out the method disclosed in document 2 in the optical filter disclosed in document 1 in order to selectively and sharply block ultraviolet radiation so that the inclination is 3 or more.

On such occasion, it would not be particularly

difficult to improve or optimize the specific content amount of each component so as to satisfy the numerical ranges set forth in claims 5-6 and 8 of the present application.

Therefore, a person skilled in the art could easily have conceived of the invention as in claims 3 and 5-8 of the present application on the basis of disclosures in documents 1 and 2.

[III.] The invention as in claims 1-8 and 11 of the present application does not involve an inventive step in the light of documents 2 and 3.

Document 3 discloses a near infrared light-absorbing optical filter which contains Cu as a cation component and Cl as an anion component, and which satisfies the optical characteristics set forth in claims 2-3 of the present application (claim 21, tables 3-5, fig. 1). In addition, there is a high probability that the optical filter disclosed in document 3 satisfies the optical characteristics set forth in claim 4 of the present application in view of the shape of the spectral transmittance curve of the optical filter (fig. 1).

As mentioned above, document 2 discloses incorporating 0.01-10wt% of crystals of a copper halide and 0.001-1wt% of silver in an optical filter (claim 1, paragraphs [0033]-[0038], [0044], [0045], fig. 1).

Therefore, a person skilled in the art could easily have incorporated the copper halide and Ag in the optical filter disclosed in document 3 in order to selectively and sharply block ultraviolet radiation so that the prescribed inclination set forth in claim 1 of the present application is 3 or more.

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

On such occasion, it would not be particularly difficult to improve or optimize the specific content amount of each component so as to satisfy the numerical ranges set forth in claims 5-6 and 8 of the present application.

Therefore, a person skilled in the art could easily have conceived of the invention as in claims 1-8 and 11 of the present application on the basis of disclosures in documents 2 and 3.

[IV.] The invention as in claims 1-9 and 11 of the present application does not involve an inventive step in the light of documents 2 and 4.

Document 4 discloses a near infrared radiation-blocking filter which has a high transmittance in the range 350-650 nm, is such that the wavelength at which the transmission in the near infrared (NIR) range is 50% is 611 nm, which has a "steep edge" in the UV region, and which satisfies the compositional requirements set forth in claim 9 of the present application (claim 8, paragraphs [0002], [0010], [0078], table 4, fig. 2, especially example 17).

As mentioned above, document 2 discloses incorporating 0.01-10wt% of crystals of a copper halide and 0.001-1wt% of silver in an optical filter (see claim 1, paragraphs [0033]-[0038], [0044], [0045], fig. 1).

Therefore, a person skilled in the art could easily have incorporated the copper halide and Ag in the blocking filter disclosed in document 4 in order to selectively and sharply block ultraviolet radiation so that the prescribed inclination set forth in claim 1 of the present application is 3 or more.

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

On such occasion, it would not be particularly difficult to improve or optimize the specific content amount of each component so as to satisfy the numerical ranges set forth in claims 5-6 and 8 of the present application, thereby satisfying the optical characteristics set forth in claims 2-4 of the present application.

Therefore, a person skilled in the art could easily have conceived of the invention as in claims 1-9 and 11 of the present application on the basis of disclosures in documents 2 and 4.

[V.] The invention as in claims 1-8 and 10-11 of the present application does not involve an inventive step in the light of documents 2 and 5.

Document 5 discloses an IR/UV-absorbing blocking filter which satisfies the compositional requirements set forth in claim 10 of the present application (paragraphs [0001]-[0005], [0037], [0056], tables 1, 2, fig. 1, especially examples 2, 3).

As mentioned above, document 2 discloses incorporating 0.01-10wt% of crystals of a copper halide and 0.001-1wt% of silver in an optical filter (claim 1, paragraphs [0033]-[0038], [0044], [0045], fig. 1).

Therefore, a person skilled in the art could easily have incorporated the copper halide and Ag in the blocking filter disclosed in document 5 in order to selectively and sharply block ultraviolet radiation so that the prescribed inclination set forth in claim 1 of the present application is 3 or more.

On such occasion, it would not be particularly difficult to improve or optimize the specific content

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

amount of each component so as to satisfy the numerical ranges set forth in claims 5-6 and 8 of the present application, thereby satisfying the optical characteristics set forth in claims 2-4 of the present application.

Therefore, a person skilled in the art could easily have conceived of the invention as in claims 1-8 and 10-11 of the present application on the basis of disclosures in documents 2 and 5.