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(54) Title: DENTAL COMPOSITION

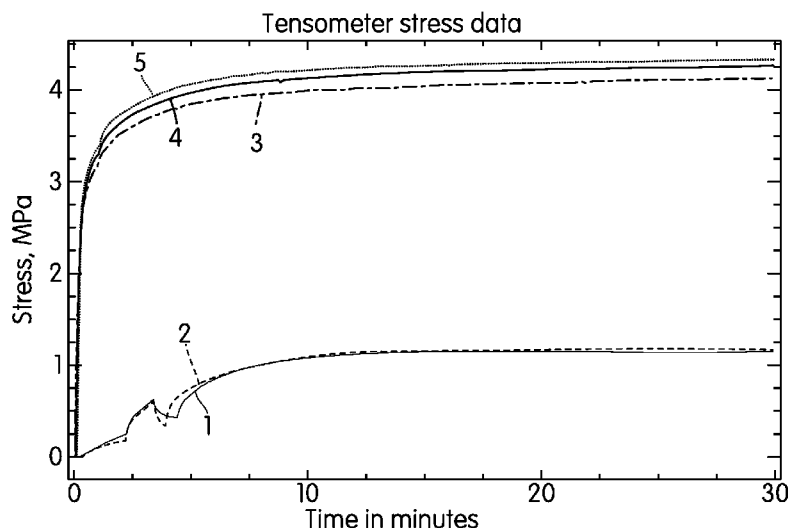


FIG. 2

(57) Abstract: Disclosed herein is a dental material containing a polymerizable hydrolysis stable polycyclic amide monomer. The present disclosure relates to methods of making and use of the polymerizable hydrolysis stable polycyclic amide monomer for the preparation of a dental polymerizable hydrolysis stable polycyclic amide monomer composition. The present disclosure further relates to a cured dental material obtained by polymerizing the dental material.



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 November 2020 (26.11.2020)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2020/027417

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.: **1-13(partially)**
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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:

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.:

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

International application No
PCT/US2020/027417

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A61K6/61 A61K6/62 A61K6/71 A61K6/887
 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)
 A61K
 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, CHEM ABS Data, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2006/178469 A1 (MOSZNER NORBERT [LI] ET AL) 10 August 2006 (2006-08-10) claims 1-12 paragraph [0145] -----	1-13
A	US 5 889 132 A (RHEINBERGER VOLKER [LI] ET AL) 30 March 1999 (1999-03-30) column 2, line 41 - column 10, line 65 -----	1-13
A	EP 1 815 838 A1 (3M INNOVATIVE PROPERTIES CO [US]) 8 August 2007 (2007-08-08) paragraph [0090] claim 1 -----	1-13
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 9 October 2020	Date of mailing of the international search report 19/10/2020
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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 Gomes Pinto F., R
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2020/027417

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CA 2 297 442 A1 (IVOCLAR AG [LI]) 1 August 2000 (2000-08-01) page 9, last paragraph - page 11, first paragraph claims 1-15	1-13
A	----- ALUPEI V ET AL: "Forgotten monomers: free radical polymerization behavior of norbornadiene derivatives in comparison with methyl methacrylate", POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, vol. 45, no. 7, 1 March 2004 (2004-03-01), pages 2111-2117, XP004493325, ISSN: 0032-3861, DOI: 10.1016/J.POLYMER.2004.01.056 Schemes 1 and 2; page 2112, first paragraph -----	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2020/027417

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006178469	A1	10-08-2006	AT 493107 T 15-01-2011
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		JP 2000226306 A	15-08-2000

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1-13(partially)

Present claim 1 is defined by the compound of formula (I). Examples for a compound according to this formula are found on page 14 and page 15. In all these examples, m according to formula (I) is 2, and Z is a 2-valent group. No support and disclosure in the sense of Article 6 and 5 PCT is to be found at all for claim 1, which states that Z is a m+1 valent group. Z is in all examples a m valent group.

The ISA performed the search taking into account the examples and considering Z a m valent group.

Present claim 1 relates to an extremely large number of possible compounds. Support and disclosure in the sense of Article 6 and 5 PCT is to be found however for only a very small proportion of the compounds, see example 1 and compounds on page 14 and 15. Hence, there is no support for the case of n=0. In this case the compound of formula 1 would be dicyclic and not tricyclic and there is no proof or convincing argument that it would work to reduce polymerization shrinkage stress. The same applies for the case in which X is O or S.

The ISA performed the search taking into account that X is a -CH- group as in all examples.

The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search of claim (PCT Guidelines 9.19 and 9.23). The search of claim 1 was restricted to those claimed compounds which appear to be supported and a generalisation of their structural formulae, namely where Z is a m valent group and X is a -CH₂- group.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.