

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QORVO, INC.,

Petitioner,

v.

CORNELL RESEARCH FOUNDATION, INC.,

Patent Owner.

Case No. IPR2024-00758

U.S. Patent No. 7,250,360

Declaration of Sylvia Hall-Ellis, Ph.D.

I, Dr. Sylvia Hall-Ellis, declare as follows:

I. INTRODUCTION

1. I have been retained by Sheppard, Mullin, Richter & Hampton LLP on behalf of Qorvo, Inc. (“Qorvo” and/or “Petitioner”) for the above-captioned inter partes review proceeding.

2. I have been retained as an expert by Qorvo to provide my expert opinion regarding the authenticity and public availability of a publication: “Metal Organic Vapour-Phase Epitaxy (MOVPE) Growth of InP and InGaAs Using Tertiarybutylarsine (TBA) and Tertiarybutylphosphine (TBP) in N₂ Ambient” by D. Keiper, R. Westphalen, and G. Landgren (hereafter “Keiper”). I understand that Keiper is Exhibit 1006 in the above-captioned inter partes review proceeding.

3. I recently prepared a Declaration in IPR2024-00609 (*IQE PLC v. Cornell Research Foundation, Inc.*) stating my opinion that Keiper (Exhibit 1006) was published and accessible to the public on or shortly after July 20, 1999 (the “IQE Declaration”). I append the IQE Declaration hereto and hereby confirm my opinion that Keiper (Exhibit 1006) was published and accessible to the public on or shortly after July 20, 1999 for the same reasons expressed in the IQE Declaration.

4. I am being compensated by Qorvo at my standard hourly rate of \$400 for the time I spend in connection with this proceeding. My compensation is not

dependent in any way on the substance of my opinions or in the outcome of this proceeding.

5. I am over 18 years of age. I have personal knowledge of the facts stated in this declaration (and the appended IQE Declaration) and could testify competently to them if asked to do so.

6. My opinions are based upon the information that I have considered to date. I reserve the right, however, to supplement my opinions in the future to respond to any arguments raised by the Patent Owner and to take into account new information that becomes available to me.

7. In signing this declaration, I recognize that this declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

8. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on April 15, 2024.

By:


Dr. Sylvia Hall-Ellis

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

IQE PLC,
Petitioner

v.

CORNELL RESEARCH FOUNDATION, INC.,
Patent Owner

Case IPR2024-00609
U.S. Patent No. 7,250,360

DECLARATION OF SYLVIA D. HALL-ELLIS, PH.D.

Mail Stop "PATENT BOARD"
Patent Trial and Appeal Board
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

IQE EX1010
U.S. Patent No. 7,250,360

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I. INTRODUCTION

1. My name is Sylvia D. Hall-Ellis. I have been retained as an expert on behalf of IQE PLLC (“Petitioner”).

2. I have written this report on behalf of Petitioner to provide my expert opinion regarding the authenticity and public availability of a publication. My report sets forth my opinions in detail and provides the basis for my opinions regarding the public availability of this publication.

3. I reserve the right to supplement or amend my opinions, and bases for them, in response to any additional evidence, testimony, discovery, argument, and/or other additional information that may be provided to me after the date of this report.

4. I am being compensated for my time spent working on this matter at my normal consulting rate of \$400 per hour, plus reimbursement for any additional reasonable expenses. My compensation is not in any way tied to the content of this report, the substance of my opinions, or the outcome of this proceeding. I have no other interests in this proceeding or with any of the parties.

5. All of the materials that I considered are discussed explicitly in this declaration.

II. QUALIFICATIONS

6. I am currently an Adjunct Professor in the School of Information at San José State University. I obtained a Master of Library Science from the University of North Texas in 1972 and a Ph.D. in Library and Information Science from the University of Pittsburgh in 1985. Over the last 55-plus years, I have held various positions in the field of library and information resources. I was first employed as a librarian in 1966 and have been involved in the field of library sciences since, holding numerous positions.

7. I am a member of the American Library Association (ALA) and its Association for Library Collections & Technical Services (ALCTS) Division, and I served on the Committee on Cataloging: Resource and Description (which wrote the new cataloging rules) and as the chair of the Committee for Education and Training of Catalogers and the Competencies and Education for a Career in Cataloging Interest Group. I also served as the Chair of the ALCTS Division's Task Force on Competencies and Education for a Career in Cataloging. Additionally, I have served as the Chair for the ALA Office of Diversity's Committee on Diversity, as a member of the REFORMA National Board of Directors, as a member of the Editorial Board for the ALCTS premier cataloging journal, Library Resources and Technical Services, as a Co-Chair of the Library Research Round Table (LRRT) for the American Library Association, and as a

member of the LRRT Nominating Committee. Currently I serve as a member of the CORE division Margaret Mann Citation Committee.

8. I have also given over one hundred presentations in the field, including several on library cataloging systems and Machine-Readable Cataloging (“MARC”) standards. My current research interests include library cataloging systems, metadata, and organization of electronic resources.

9. My full curriculum vitae is submitted herewith as Exhibit 1012.

III. PRELIMINARIES

10. *Scope of this declaration.* I am not an attorney and will not offer opinions on the law. I am, however, rendering my expert opinion on the authenticity of the documents referenced herein and on when and how each of these documents was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, could have located the documents before or around the listed dates of their respective publications below.

11. I am informed by counsel that a printed publication qualifies as publicly accessible as of the date it was disseminated or otherwise made available such that a person interested in and ordinarily skilled in the relevant subject matter could locate it through the exercise of ordinary diligence.

12. While I understand that the determination of public accessibility under the foregoing standard rests on a case-by-case analysis of the facts particular to an individual publication, I also understand that a printed publication is rendered “publicly accessible” if it is cataloged and indexed by a library such that a person interested in the relevant subject matter could locate it (i.e., I understand that cataloging and indexing by a library is sufficient, though there are other ways that a printed publication is sufficient, even if the single library is in a foreign country). I understand that, even if access to a library is restricted, a printed publication that has been cataloged and indexed therein is publicly accessible so long as a presumption is raised that the portion of the public concerned with the relevant subject matter would know of the printed publication. I also understand that the cataloging and indexing of information that would guide a person interested in the relevant subject matter to the printed publication, such as the cataloging and indexing of an abstract for the printed publication, is sufficient to render the printed publication publicly accessible.

13. I understand that routine business practices, such as general library cataloging and indexing practices, can be used to establish an approximate date on which a printed publication became publicly accessible.

14. *Persons of ordinary skill in the art.* I am told by counsel that the subject matter of this proceeding generally relates to semiconductor manufacturing, and more specifically nucleation and epitaxial growth processes.

15. I have been informed by counsel that a “person of ordinary skill in the art at the time of the inventions” is a hypothetical person who is presumed to be a person of ordinary creativity, capable of understanding the scientific principles applicable to the pertinent field.

16. I am told by counsel that persons of ordinary skill in this subject matter or art would have held at least a bachelor’s degree in electrical engineering, computer engineering, chemical engineering, or an equivalent field, or an advanced degree in those fields, as well as least 3-5 years of academic or industry experience in nucleation and epitaxial growth processes, or comparable industry experience.

17. It is my opinion that such a person would have been engaged in research, learning the bibliographic resources relevant to his or her research through study and practice in the field and possibly through formal instruction. In the 2005 timeframe, such a person would have had access to a vast array of long-established print and electronic resources in the areas of semiconductor manufacturing, nucleation, and epitaxial growth processes.

IV. LIBRARY CATALOGING PRACTICES

A. MARC Records and the Online Library Catalog

18. I am fully familiar with the library cataloging standard known as the MARC standard, which is an industry-wide standard method of storing and organizing library catalog information.¹ MARC was first developed in the 1960s by the Library of Congress. A MARC-compatible library is one that has a catalog consisting of individual MARC records for each of its items. Today, MARC is the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.

19. MARC is a framework into which descriptive bibliographic data are transcribed to interact with the software in online library catalogs to provide access to books, journals, and other resources in the collection. The bibliographic data provide points of access and could have been searched by a person of ordinary skill in the art at the time of the invention (“POSITA,” see paragraphs 14-17 above) to identify and obtain resources in the library collection. An information seeker (or POSITA) can search a local online library catalog or the holdings of a group of libraries in a state or region or in the global catalog WorldCat.

20. MARC records are not designed for public viewing. Although a significant number of libraries provide access to the MARC version of a

¹ The full text of the standard is available from the Library of Congress at <http://www.loc.gov/marc/bibliographic/> (last visited February 20, 2024).

bibliographic record, the public display is designed to show information in a succinct manner that is quickly understood and useful to the information seeker. Libraries determine the default search for the online catalog to make the entry of search terms efficient and result in a successful search. Information seekers can enter a keyword, title, author, or standard number for the item. Libraries may also provide a search capability called “Summon” that allows the information seeker to enter known information about the item to conduct a search.

21. Since at least the early 1970s and continuing to the present day, MARC has been the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.² As explained by the Library of Congress:

You could devise your own method of organizing the bibliographic information, but you would be isolating your library, limiting its options, and creating much more work for yourself. Using the MARC standard prevents duplication of work and allows libraries to better

² A complete history of the development of MARC can be found in *MARC: Its History and Implications* by Henrietta D. Avram (Washington, DC: Library of Congress, 1975) and available online from the Hathi Trust (<https://babel.hathitrust.org/cgi/pt?id=mdp.39015034388556;view=1up;seq=1>; last visited February 20, 2024).

share bibliographic resources. Choosing to use MARC enables libraries to acquire cataloging data that is predictable and reliable. If a library were to develop a “home-grown” system that did not use MARC records, it would not be taking advantage of an industry-wide standard whose primary purpose is to foster communication of information.

Using the MARC standard also enables libraries to make use of commercially available library automation systems to manage library operations. Many systems are available for libraries of all sizes and are designed to work with the MARC format. Systems are maintained and improved by the vendor so that libraries can benefit from the latest advances in computer technology. The MARC standard also allows libraries to replace one system with another with the assurance that their data will still be compatible.

Why is a MARC Record Necessary? Library of Congress.³

22. Thus, almost every major library in the world is MARC-compatible.

See, e.g., MARC Frequently Asked Questions (FAQ), Library of Congress.⁴

³ <http://www.loc.gov/marc/umb/um01to06.html#part2>

⁴ <http://www.loc.gov/marc/faq.html>

(“MARC is the acronym for MACHine-Readable Cataloging. It defines a data format that emerged from a Library of Congress-led initiative that began nearly forty years ago. It provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today.”). MARC is the ANSI/NISO Z39.2-1994 standard (reaffirmed in 2016) for Information Interchange Format. The full text of the standard is available from the Library of Congress.⁵

23. Examining the MARC records for a specific item reveals the comprehensive data transcribed about a particular item at the time that cataloging and classification occurred. In addition to the creator, title, subjects, and standard numbers, additional information may provide additional and relevant data depending on the type of resource. Understanding the full extent of bibliographic data for an item and the points of access associated with it provides essential information that can be used to determine the indexing and public availability for documents described in this declaration.

B. MARC Records

24. A MARC record comprises several fields, each of which contains specific data about the work. Each field is identified by a standardized, unique,

⁵ <http://www.loc.gov/marc/bibliographic/>

three-digit code corresponding to the type of data that follow. For example, a work's title is recorded in Field 245; the primary author of the work is transcribed in field 100; an item's International Standard Book Number ("ISBN") consisting of ten or thirteen digits is transcribed in field 020; an item's International Standard Serial Number ("ISSN") is transcribed in Field 022; the Library of Congress classification notation is recorded in Field 050; and the publication date is recorded in Field 260 under the subfield "c." If a work is a periodical, then its publication frequency is recorded in Field 310, and the publication dates (e.g., the first and last publication) are recorded in Field 362, which is also referred to as the enumeration/chronology field.⁶

25. The library that created the record is recorded in Field 040 in subfield "a" with a unique library code. When viewing the MARC record online via Online Computer Library Center's ("OCLC") bibliographic database, hovering over this code with the mouse reveals the full name of the library. I used this method of "mousing over" the library codes in the OCLC database to identify the originating library for the MARC records discussed in this Declaration. Where this "mouse

⁶ <http://www.loc.gov/marc/bibliographic/bd3xx.html>

over” option was not available, I consulted the Directory of OCLC Libraries to identify the institution that created the MARC record.⁷

26. MARC records also include several fields that include subject matter classification information. An overview of MARC records fields is available through the Library of Congress.⁸ For example, 6XX fields are termed “Subject Access Fields.”⁹ Among these, for example, is the 650 field; this is the “Subject Added Entry – Topical Term” field.¹⁰ The 650 field is a “[s]ubject added entry in which the entry element is a topical term.” These entries “are assigned to a bibliographic record to provide access according to generally accepted thesaurus-building rules (e.g., Library of Congress Subject Headings (LCSH), Medical Subject Headings (MeSH)).” *Id.* Further, MARC records include call numbers, which themselves include a classification number. For example, the 050 field is the “Library of Congress Call Number.”¹¹ A defined portion of the Library of Congress Call (LCC) Number is the classification number, and “source of the

⁷ <https://www.oclc.org/en/contacts/libraries.html>

⁸ <http://www.loc.gov/marc/bibliographic>

⁹ <http://www.loc.gov/marc/bibliographic/bd6xx.html>

¹⁰ <http://www.loc.gov/marc/bibliographic/bd650.html>

¹¹ <http://www.loc.gov/marc/bibliographic/bd050.html>

classification number is Library of Congress Classification and the LC Classification-Additions and Changes.” Thus, included in the 050 field is a subject matter classification. Further, the 082 field is the “Dewey Decimal Classification Number.”¹² A defined portion of the Dewey Decimal Classification (DDC) Number is the classification number, and “source of the classification number is the Dewey Decimal Classification.” Thus, included in the 082 field is a subject matter classification. Each item in a library has a single classification number. A library selects a classification scheme (e.g., the Library of Congress classification scheme just described or a similar scheme such as the Dewey Decimal classification scheme) and uses it consistently. When the Library of Congress assigns the LCC classification number, it appears as part of the 050 field. When the Library of Congress assigns the DDC classification number, it appears as part of the 082 field. If a local library assigns the classification number, it appears in a 090 field. In either scenario, the MARC record includes a classification number that represents a subject matter classification.

C. OCLC

27. The OCLC was created “to establish, maintain and operate a computerized library network and to promote the evolution of library use, of

¹² <http://www.loc.gov/marc/bibliographic/bd082.html>

libraries themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information.”¹³ Among other services, OCLC and its members are responsible for maintaining the WorldCat database (<http://www.worldcat.org/>), used by independent and institutional libraries throughout the world.

28. OCLC also provides its members online access to MARC records through its OCLC bibliographic database. When an OCLC member institution acquires a work, it creates a MARC record for this work in its computer catalog system in the ordinary course of its business. MARC records created at the Library of Congress are tape-loaded into the OCLC database through a subscription to MARC Distribution Services daily or weekly. Once the MARC record is created by a cataloger at an OCLC member institution or is tape-loaded from the Library of Congress, the MARC record is then made available to any other OCLC

¹³ Third Article, Amended Articles of Incorporation of OCLC, Inc. (available at <https://www.oclc.org/content/dam/oclc/membership/articles-of-incorporation.pdf>).

members online, and therefore made available to the public. Accordingly, once the MARC record is created by a cataloger at an OCLC member institution or is tape-loaded from the Library of Congress or another library anywhere in the world, any publication corresponding to the MARC record has been cataloged and indexed according to its subject matter such that a person interested in that subject matter could, with reasonable diligence, locate and access the publication through any library with access to the OCLC bibliographic database or through the Library of Congress.

29. When an OCLC member institution creates a new MARC record, OCLC automatically supplies the date of creation for that record. The date of creation for the MARC record appears in the fixed Field (008), characters 00 through 05. The MARC record creation date reflects the date on which, or shortly after which, the item was first acquired or cataloged. Initially, Field 005 of the MARC record is automatically populated with the date the MARC record was created in year, month, day format (YYYYMMDD) (some of the newer library catalog systems also include hour, minute, second (HHMMSS)). Thereafter, the library's computer system may automatically update the date in Field 005 every time the library updates the MARC record (e.g., to reflect that an item has been moved to a different shelving location within the library). Field 005 is visible when viewing a MARC record via an appropriate computerized interface, but when a

MARC record is printed to hardcopy, no “005” label appears. The initial Field 005 date (i.e., the date the MARC record was created) does appear, however, next to the label “Entered.”¹⁴ The date upon which the most recent update to Field 005 occurred also appears, next to the label “Replaced.” Thus, when an item’s MARC record has been printed to hardcopy—as is the case with the MARC attachments to this Declaration—the date reflected next to the label “Entered” is necessarily on or after the date the library first cataloged and indexed the underlying item.

30. Once one library has cataloged and indexed a publication by creating a MARC record for that publication, other libraries that receive the publication do not create additional MARC records—the other libraries instead rely on the original MARC record. They may update or revise the MARC record to ensure accuracy, but they do not replace or duplicate it. This practice does more than save libraries from duplicating labor. It also enhances the accuracy of MARC records. Further, it allows librarians around the world to know that a particular MARC

¹⁴ Field 005 is visible when viewing a MARC record via an appropriate computerized interface. But when a MARC record is printed directly to hardcopy from the OCLC database, the “005” label is not shown. The date in the 005 field instead appears next to the label “Replaced.”

record is authoritative (in contrast, a hypothetical system wherein duplicative records were created would result in confusion as to which record is authoritative).

31. Catalogers can create MARC records for all types of print, online, and digital resources. The date of creation of the MARC record by a cataloger at an OCLC member institution reflects when the underlying item is accessible to the public. Upwards of two-thirds to three-quarters of book sales and magazine subscriptions to libraries come from a jobber or wholesaler for online and print resources. These resellers make it their business to provide items to their customers as fast as possible, often providing turnaround times of only a single day after publication. Libraries purchase a significant portion of the balance of their books and journals directly from publishers themselves, which provide delivery on a similarly expedited schedule. In general, libraries make these purchases throughout the year and shelve the newly received items as soon thereafter as possible to make them available to their patrons.

D. Journals

32. Catalogers can create MARC records for all types of print, online, and digital resources. For example, MARC records cover serial publications, including both serially-published monographs and journals. OCLC hosts MARC records for more than 320 million serial publications. Serial publications are those publications that have the same collective title but are intended to be continued indefinitely with

enumeration such as a volume or issue number (e.g., magazines, journals, etc.). In the OCLC bibliographic database, the first issue of the serial publication is typically cataloged (i.e., a corresponding MARC record is created), but the date is left open-ended with the use of a punctuation mark such as a dash. OCLC serial publication MARC records represent the entire run of the serial title. With knowledge of the first issue published, future issues can be predicted based on the information provided in the MARC record, for example in field 362. In my extensive professional experience, it is highly unusual for a library to stop collecting and shelving a serial publication prior to the end of its publication run. If a subscription to a serial publication ends its run or is cancelled before the end of its run, the library will denote that it has stopped receiving new volumes by filling in the end date in the MARC record.

33. The handling of printed journal subscriptions is shown on the cover or the first few pages of individual issues. As was the best practice among libraries, issues arrived at a central facility and were immediately received, verified as part of a subscription, checked in, and stamped or labeled with the institution's name and date. Determining that the issue was part of the library subscription ensured that the entire set of publications for the year had been received so that they could be professionally bound and retained. This process also verified that all of the published issues arrived so that the library staff did not have to request or claim an

issue that did not arrive as expected. In large public libraries with branches and multi-campus libraries within academic institutions, the journals were sorted and delivered to the subscribing unit. The new issue was placed in the public area; the older issue was stored so that it remained available.

34. The foregoing process has been standard library practice longer than I have been working in the profession. I first learned the steps in the process in the late 1970s and later supervised it. Although the checking in process has become automated and now links electronically to holdings records for the MARC record for each serial title, the manual placement of a stamp or label and placing the issue in a public area has not changed for 50 years. Unless I note otherwise below in reference to a specific serial publication, it is my expert opinion that this standard protocol was followed for all of the serial publications discussed below.

35. In preparing this report, I used authoritative databases, such as the OCLC bibliographic database and the Library of Congress Online Catalog, to confirm citation details of the various publications discussed.

E. Indexing

36. A researcher may discover material relevant to his or her topic in a variety of ways. One common means of discovery is to search for relevant information in an index of periodical and other publications. Having found relevant material, the researcher will then normally obtain it online, look for it in libraries,

or purchase it from a publisher, a bookstore, a document delivery service, or other provider. Sometimes, the date of a document's public accessibility will involve both indexing and library date information. However, date information for indexing entries is often unavailable. This is especially true for online indices.

37. Indexing services use a wide variety of controlled vocabularies to provide subject access and other means of discovering the content of documents. The formats in which these access terms are presented vary from service to service.

38. Online indexing services commonly provide bibliographic information, abstracts, and full-text copies of the indexed publications, along with a list of the documents cited in the indexed publication. These services also often provide lists of publications that cite a given document. A citation of a document is evidence that the document was publicly available and in use by researches no later than the publication date of the citing document.

39. Before the widespread development of online databases to index articles in journals, magazines, conference papers, and technical reports, libraries purchased printed volumes of indices. Graduate library school education mandated that students learn about the bibliographic control of disciplines, the prominent indexing volumes, and searching strategies required to use them effectively and efficiently. Half of the courses that I studied in library school were focused on the bibliography and resources in academic disciplines.

40. Librarians consulted with information seekers to verify citations, check availability in union catalogs, printed books catalogs, the OCLC database, and make formal requests for materials (e.g., books, conference proceedings, journal articles). Requests were transmitted using Telex machines, rudimentary email systems, and the United States Postal Service. During my career, I have performed and supervised staff who handled these resource sharing tasks.

41. A major firm known for the breadth of subjects and comprehensive treatment in the preparation of index volumes, the H. W. Wilson Company offered these reference resources since the firm was founded in 1898. The Reader's Guide to Periodical Literature is one of the best-known titles available from H. W. Wilson. Each volume includes a comprehensive index for 300 of the most popular and important periodicals published in the United States and Canada. Information seekers have subject access expressed in plain language terminology, author access, and cross reference to find the desired results from their searches. The family of index titles included Science & Technology Index, Business Periodicals, Applied Science & Terminology Index, Humanities Index, Biological & Agricultural Index, and Industrial Arts Index. These printed indices have been superseded by digital database offerings available to information seekers through Ebsco.

42. Online indexing services such as Google Scholar¹⁵ or Science Direct¹⁶ commonly provide bibliographic information, abstracts, and full-text copies of the indexed publications, along with a list of the documents cited in the indexed publication. These services also often provide lists of publications that cite a given document.

43. A citation of a document by another is evidence that the document was publicly available and in use no later than the publication date of the citing document.

V. DOCUMENT 1: EXHIBIT 1006 (“KEIPER”)

44. Exhibit 1006 is a copy of the journal article titled “Metal Organic Vapour-Phase Epitaxy (MOVPE) Growth of InP and InGaAs Using Tertiarybutylarsine (TBA) and Tertiarybutylphosphine (TBP) in N₂ Ambient” by D. Keiper, R. Westphalen, and G. Landgren (hereafter “Keiper”). The Keiper article was published in Volume 204, Number 3 of the Journal of Crystal Growth and was found in the Linda Hall Library of Science, Engineering & Technology (Kansas City, Missouri). The Keiper article appears on pages 256-262 of the issue dated July 1999. Exhibit 1006 is a true and correct copy of the Keiper article that I

¹⁵ <https://scholar.google.com/>

¹⁶ <https://www.sciencedirect.com/>

obtained from the Linda Hall Library of Science, Engineering & Technology that I understand is being submitted as an exhibit in this proceeding. Exhibit 1006 is a true and correct copy in a condition that creates no suspicion about its authenticity. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document.

45. The Keiper article is available from the publisher, Elsevier.¹⁷ The publisher lists an online publication date of July 9, 1999.

46. Attached hereto as Attachment 1A is a true and correct copy of the MARC record for the Journal of Crystal Growth from the Linda Hall Library of Science, Engineering & Technology online catalog. Library ownership is indicated by the presence of the library's code ("LHL") in field 049. The library continues to update this MARC record and enhanced the MARC record to meet current cataloging rules. The last revision to Attachment 1A occurred on September 6, 2023, as shown in field 005 ("20230906"). I personally identified and retrieved the MARC record that is Attachment 1A.

47. Based on finding a copy of Exhibit 1006 in the Linda Hall Library of Science, Engineering & Technology and the MARC record in its online library

¹⁷ <https://www.sciencedirect.com/science/article/abs/pii/S0022024899002109>

catalog attached as Attachment 1A, it is my opinion that the Keiper article published in the Journal of Crystal Growth was publicly available on or shortly after July 20, 1999, as shown by the library's stamp on the cover and on page 3. In common practice these stamps are applied at or around the time the volume is entered into the library's collection and the volume is made available to library patrons within a short time thereafter.

48. As noted in the holdings information (362 field), the Linda Hall Library of Science, Engineering & Technology has received the Journal of Crystal Growth since January 1967 and continues to receive the publication. In view of the MARC record for Exhibit 1006, the Keiper article was publicly available on or shortly after July 20, 1999, because the serial title had been received, cataloged, and indexed at the Linda Hall Library of Science, Engineering & Technology and made part of its online catalog database.

49. Attached hereto as Attachment 1B is a true and correct copy of the MARC record for the Journal of Crystal Growth obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 1B, that library code is "MUL," which means that the MARC record for this serial was cataloged as part of the Minnesota Union List of Serials at the University of Minnesota Libraries (Minneapolis, Minnesota). As can be seen in the "Entered" field in the

MARC record for this exhibit, a cataloger at the University of Minnesota Libraries created OCLC record number 1604674 on September 7, 1975, as shown in field 008 “Date Entered on File” (“750907”). The library community continues to update and enhance the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 1B occurred on August 10, 2022, as shown in field 005 (“20220810”). I personally identified and retrieved the MARC record that is Attachment 1B. The “Bibliographic Level” entry in the leader (“LDR”) of Attachment 1B is “s,” which indicates that the journal is a serial. Field 310 of Attachment 1B reads “Fifty-two no. a year, \$b <2003-.” Accordingly, the MARC record for Exhibit 1006 corresponds to the Journal of Crystal Growth from the time the serial title began publication and includes the date of the Keiper article.

50. Attachment 1B includes an entry in field 050 (“QD921 \$b .J6”)—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system). Attachment 1B includes two descriptor terms reading “Crystal growth \$v Periodicals” (see Attachment 1C, Library of Congress subject heading sh85034507 and Attachment 1D, Library of Congress subject heading sh85099890) and “Crystallography \$v Periodicals” (see Attachment 1E, Library of Congress subject heading sh2009122624) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 1B was indexed

according to its subject matter by virtue of at least two independently sufficient classifications: the field 050 entry and the field 650 entries. As of September 7, 1975, the MARC record attached hereto as Attachment 1C was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the open access serial, which means that the corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library.

51. In view of the above, this issue of the Journal of Crystal Growth was publicly available on or shortly after July 20, 1999, because by that date it had been cataloged and indexed at University of Minnesota Libraries, made part of the OCLC bibliographic database, and received at the Linda Hall Library of Science, Engineering & Technology. For these reasons, it is my opinion that Exhibit 1006 was published and accessible to the public on or shortly after July 20, 1999.

VI. SUMMARY OF OPINIONS

52. In view of the foregoing, it is my opinion that the publications described above were publicly available no later than the corresponding date listed in the table below:

Exhibit	Publication	Publicly Available No Later Than
1006	Keiper, D., R. Westphalen, and G. Landgren. “Metal organic vapour-phase epitaxy	July 20, 1999

	(MOVPE) growth of InP and InGaAs using tertiarybutylarsine (TBA) and tertiarybutylphosphine (TBP) in N ₂ ambient,” <i>Journal of Crystal Growth</i> , vol. 204, no. 3 (July 1999): 256-262.	
--	--	--

53. In signing this Declaration, I recognize that the Declaration will be filed as evidence in a case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

54. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

DATED: February 29, 2024

By: 
Sylvia D. Hall-Ellis, Ph.D.

21892898

ATTACHMENT 1A

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leader 02248cas a2200589 4500
001 992746433405961
005 20230906181405.0
008 750907c19679999ne mrzp 0 a0eng d
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012 ##$a3 $en $i9009 $k1 $m0
022 ##$a0022-0248
030 ##$aJCRGAE
035 ##$a(OCOLC)1604674
035 ##$a(Horizon)380019
035 ##$a(MoKL)274643-lhalldb
035 ##$a(lhalldb)274643-lhalldb
037 ##$bElsevier Science Publishers B.V., PO Box 103, 1000 AC
Amsterdam, Netherlands
037 ##$c$3,430.00
040 ##$aMUL $cMUL $dOCL $dNSD $dOCL $dNSD $dDLC $dSER $dAIP $dOCL
$dAIP $dNST $dNSD $beng
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042 ##$ansdp $alc
049 ##$aLHLA
050 00$aQD921 $b.J6
210 0#$aJ. cryst. growth
222 #0$aJournal of crystal growth
245 00$aJournal of crystal growth.
260 ##$aAmsterdam, $bNorth-Holland Pub. Co.
310 ##$aMonthly, $b<Dec. 1976->
321 ##$aBimonthly, $b1967-
362 0#$av. 1- Jan. 1967-
510 1#$aComputer & control abstracts, $x0036-8113 $b1968-
510 1#$aElectrical & electronics abstracts, $x0036-8105 $b1968-
510 1#$aPhysics abstracts. Science abstracts. Series A, $x0036-
8091 $b1968-
510 2#$aChemical abstracts, $x0009-2258
510 2#$aElectronics and communications abstracts journal
(Riverdale), $x0361-3313
510 2#$aGeoRef, $x0197-7482
510 2#$aInternational aerospace abstracts, $x0020-5842
510 2#$aISMEC bulletin, $x0306-0039
510 2#$aMetals abstracts, $x0026-0924
510 2#$aPollution abstracts with indexes, $x0032-3624
510 2#$aSaftey science abstracts journal, $x0160-1342
510 2#$aWorld aluminum abstracts, $x0002-6697
510 0#$aNuclear science abstracts, $x0029-5612
546 ##$aEnglish, French or German with summaries in English.
555 ##$aIndex: v1-10(1967-71) and index to each 10 vols.
thereafter bd w/last vol. covered.
850 ##$aAU $aArU $aCU-S $aDLC $aICU $aIaAS $aKyLoU $aMiDW $aMnU
$aNN $aNNE $aNcD $aPU $aUPB $aViBlbV
936 ##$aUnknown $aJuly 1992

```

945 ##\$aJournal of crystal growth. \$bJournal of crystal growth.
948 ##\$aLTI 09/01/2008
948 ##\$aLTI 03/09/2009
948 ##\$aLTI 02/03/2010
948 ##\$aLTI 04/27/2010

ATTACHMENT 1B

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Bibliographic Record - OCLC Number: 1604674

LDR	Record Status	'c' - Corrected or revised
	Type of Record	'a' - Language material
	Bibliographic Level	's' - Serial
	Type of Control	' ' - No specified type of control
	Encoding Level	' ' - Full level
	Descriptive Cataloging Form	' ' - Non-ISBD
001	1604674	
005	20220810194638.5	
008	Date Entered on File	'750907'
	Type of Date/Publication Status	'c' - Continuing resource currently published
	Date1/Beginning Date of Publication	'1967'
	Date2/Ending Date of Publication	'9999'
	Place of Publication, Production, or Execution Code	'ne ' - Netherlands
	Frequency	'w' - Weekly
	Regularity	'x' - Completely irregular
	Type of Continuing Resource	'p' - Periodical
	Form of Original Item	' ' - None of the following
	Form of Item	' ' - None of the following
	Nature of Entire Work	' ' - No specified nature of entire work
	Nature of Contents	' '
	Government Publication	' ' - Not a government publication
	Conference Publication	'0' - Not a conference publication
	Original Alphabet or Script of Title	'a' - Basic Roman
	Entry Convention	'0' - Successive entry
	Language Code	'eng' - English
	Modified Record	' ' - Record is not modified
	Cataloging Source Code	'c' - Cooperative cataloging program
010	sf 80000811 \$z sn 79009244 \$z 68026537	
040	MUL \$b eng \$c MUL \$d OCL \$d NSD \$d OCL \$d NSD \$d DLC \$d SER \$d AIP \$d OCL \$d AIP \$d NST \$d NSD \$d GUA \$d CUS \$d SYS \$d NLM \$d OCLCQ \$d D LC \$d GUA \$d NLGGC \$d LVB \$d AU@ \$d CIT \$d OCLCQ \$d HEBIS \$d GEBA Y \$d GBVCP \$d UKMGB \$d OCLCQ \$d OCLCF \$d OCLCO \$d DEBBG \$d OCLC Q \$d CLS \$d OCLCO \$d CNO \$d OCLCO \$d CGU \$d OCLCA \$d IUL \$d ORE \$	

d OCLCO \$d CPO \$d OCLCO \$d OKS \$d OCLCO \$d AAA \$d OCLCO \$d OCL \$
d PUL
 012 3 **\$e n \$i 9009 \$k 1 \$m 1**
 015 010044698 **\$2 dnb**
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 016 7 3043-0 **\$2 DE-600**
 016 7 100971389 **\$2 DNLM**
 016 7 010488969 **\$2 Uk**
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 022 0022-0248 **\$l 0022-0248 \$2 j**
 030 JCRGAE
 032 008819 **\$b USPS**
 037 **\$b Elsevier Science Publishers B.V., PO Box 103, 1000 AC Amsterdam, Netherlands**
 041 0 eng **\$a fre \$a ger**
 042 nsdp **\$a pcc**
 050 0 0 QD921 **\$b .J6**
 090 **\$b**

 210 0 J. cryst. growth
 222 0 Journal of crystal growth
 245 0 0 Journal of crystal growth.
 260 Amsterdam, **\$b North-Holland Pub. Co.**
 300 volumes **\$b illustrations \$c 23 cm**
 310 Fifty-two no. a year, **\$b <2003->**
 321 Frequency varies, **\$b 1967-**
 336 text **\$b txt \$2 rdacontent**
 337 unmediated **\$b n \$2 rdamedia**
 338 volume **\$b nc \$2 rdacarrier**
 362 0 v. 1- Jan. 1967-
 500 Some issues also have distinctive titles.
 510 2 Chemical abstracts **\$x 0009-2258**
 515 Some issues combined.
 546 English, French, and German; summaries in English.
 555 Vols. 1 (1967)-10 (1971), in v. 10; v. 10 (1971)-20 (1973), in v. 20; v. 21 (1974)-30 (1975), in v. 30; v. 31 (1975)-40 (1977), in v. 40.
 588 1 Vol. 251, no. 1/4 (Apr. 2003).
 650 0 Crystal growth **\$v Periodicals.**
 650 0 Crystallography **\$v Periodicals.**

650 6 Cristallographie \$v Périodiques.
 650 6 Cristaux \$x Croissance \$v Périodiques.
 650 7 Crystallography. \$2 fast \$0 (OCoLC)fst00884652
 650 7 Crystal growth. \$2 fast \$0 (OCoLC)fst00884619
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 776 0 8 \$i Online version: \$t Journal of crystal growth (Online) \$x 1873-5002 \$w (DLC) 2003
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 U \$a NN \$a NNE \$a NcD \$a PU \$a UPB \$a ViBlbV

ATTACHMENT 1C

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LCCN Permalink: <https://lcn.loc.gov/sh85034507>

HEADING: Crystal growth

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040 __ |a DLC |c DLC |d DLC

053 _0 |a QD921 |b QD923

150 __ |a Crystal growth

450 __ |w nne |a Crystals |x Growth

550 __ |w g |a Crystallization

550 __ |a Grain boundaries

550 __ |a Twinning (Crystallography)

906 __ |t 9215 |u fk07 |v 0

952 __ |a 155 bib. records to be changed

953 __ |a xx00 |b fg04

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LC control no.: sh 85099890

LCCN Permalink: <https://lcn.loc.gov/sh85099890>**HEADING:** Periodicals

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053 _0 |a PN4700 |b PN5650 |c History

150 __ |a Periodicals

360 __ |i subdivision |a Periodicals |i under specific subjects, e.g. |a Engineering--Periodicals; United States--History--Periodicals

450 __ |a Journals (Periodicals)

450 __ |a Magazines

550 __ |w g |a Library materials

550 __ |w g |a Mass media

550 __ |w g |a Serial publications

550 __ |a Newspapers

550 __ |a Press

670 __ |a UMI business vocab. |b (Journals)

680 __ |i Here are entered works on the periodicals of the world and, with appropriate subdivisions, works on special aspects or sections of periodicals. Works on periodicals in a specific language, or in a specific country or larger area, are entered under the adjectival form of the language or area, e.g. |a Arabic periodicals; Canadian periodicals.

906 __ |t 0420 |u te03 |v 0

910 __ |a Proposal saved by tc03 on 05/14/2012 at 17:15:30

953 __ |a xx00 |b td14

906 __ |t 1206 |v 0

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906 __ |t 8888 |u tc00 |v 0

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