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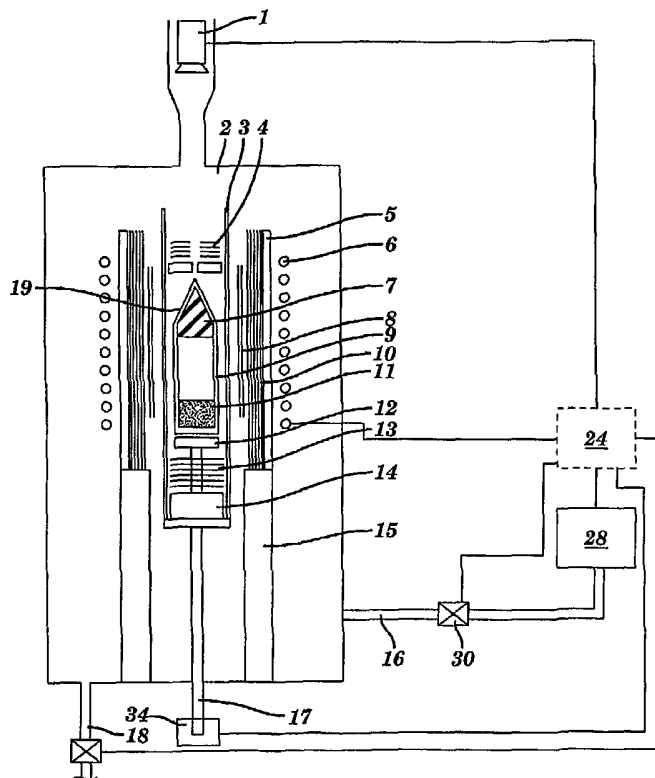
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- Published:
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR PRODUCING MONOCRYSTALLINE AlN



(57) Abstract: A method and apparatus for producing bulk single crystals (7) of AlN includes a crystal growth enclosure (9) with Al and N₂ source (11) material therein, capable of forming bulk crystals. The apparatus maintains the N₂ partial pressure at greater than stoichiometric pressure relative to the Al within the crystal growth enclosure (9), while maintaining the total vapor pressure in the crystal growth enclosure (9) at super-atmospheric pressure. At least one nucleation site (19) is provided in the crystal growth enclosure (9), and provision is made for cooling the nucleation site relative to other locations in the crystal growth enclosure (9). The Al and N₂ vapor is then deposited to grow single crystalline AlN (7) at the nucleation site (19).



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/14579

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C30B 25/00; C30B 35/00

US CL : 117/84, 88, 92, 99, 200, 204

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)

U.S. : 117/84, 88, 92, 99, 200, 204

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)
EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,086,672 A (HUNTER) 11 July 2000 (11.07.2000), document.	1-34
A	US 6,045,612 A (HUNTER) 04 April 2000 (04.04.2000), entire document.	1-34
A	US 6,296,956 B1 (HUNTER) 02 October 2001 (02.10.2001), entire document.	1-34
A	US 5,858,086 (HUNTER) 12 January 1999 (12.01.1999), entire document.	1-34
A	US 5,972,109 A (HUNTER) 26 October 1999 (26.10.1999), entire document.	1-34

☐ 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	"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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/14579

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

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

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim 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. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 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 fee, this Authority did not invite payment of any additional fee.
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.

No protest accompanied the payment of additional search fees.