

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
7 August 2003 (07.08.2003)

PCT

(10) International Publication Number
WO 2003/064059 A3

(51) International Patent Classification⁷: **H01L 21/44**

Street, Palo Alto, CA 94306 (US). **XI, Michael**; 138
Beaumere Way, Milpitas, CA 95035 (US).

(21) International Application Number:
PCT/US2003/002217

(74) Agents: **PATTERSON, Todd, B.** et al.; Moser, Patterson
& Sheridan, LLP, 3040 Post Oak Blvd., Suite 1500, Hous-
ton, TX 77056 (US).

(22) International Filing Date: 24 January 2003 (24.01.2003)

(25) Filing Language: English

(81) Designated States (*national*): JP, KR.

(26) Publication Language: English

Published:
— with international search report

(30) Priority Data:
60/352,191 26 January 2002 (26.01.2002) US
10/118,664 8 April 2002 (08.04.2002) US

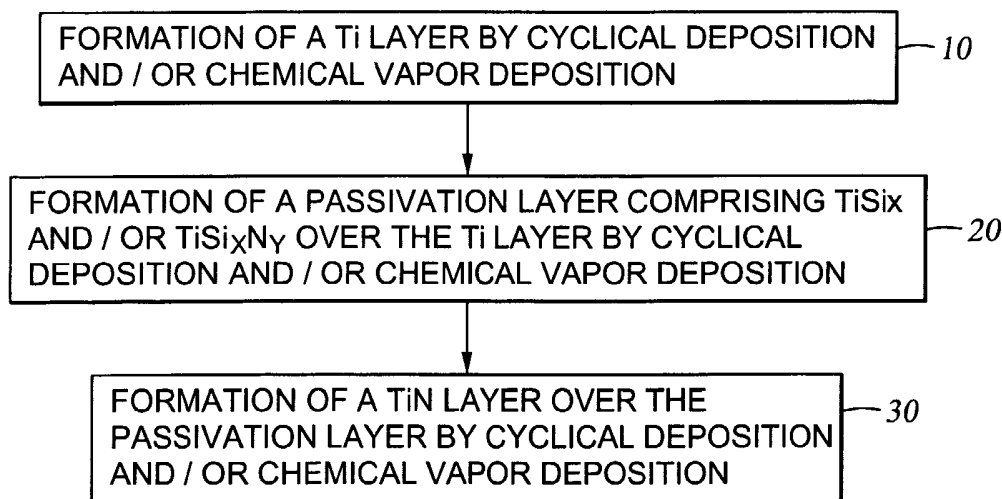
(88) Date of publication of the international search report:
26 February 2004

(71) Applicant: **APPLIED MATERIALS, INC.** [US/US];
3050 Bowers Avenue, Santa Clara, CA 95054 (US).

(72) Inventors: **YANG, Michael, X.**; 793 Cereza Drive, Palo
Alto, CA 94306 (US). **ITOH, Toshio**; 2291 Princeton

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: INTEGRATION OF TITANIUM AND TITANIUM NITRIDE LAYERS



(57) Abstract: Embodiments of the present invention generally relate to an apparatus and method of integration of titanium nitride layers. One embodiment (10, 20, 30) includes providing one or more cycles of a first set of compounds, (313) providing one or more cycles of a second set of compounds, and providing one or more cycles of a third set of compounds. One cycle of the first set of compounds includes introducing a titanium precursor and a reductant. One cycle of the second set of compounds (315) includes introducing the titanium precursor and a silicon precursor. One cycle of the third set of compounds includes introducing the titanium precursor and a nitrogen precursor. Another embodiment includes depositing a titanium layer utilizing titanium halide. Then, a passivation layer is deposited over the titanium layer utilizing titanium halide. The passivation layer may comprise titanium nitride, titanium silicon nitride, and combinations thereof. Then, a titanium nitride layer is deposited over the passivation layer utilizing titanium halide.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/02217

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(7) : H01L 21/44
 US CL : 438/653, 654, 655, 656, 683
 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. : 438/653, 654, 655, 656, 683

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 6,214,714 B1 (WANG et al) 10 April 2001 (10.04.2001), column 1, lines 44-49; column 2, lines 13-15; column 3, lines 8-11; column 4, lines 36-39; column 5, lines 57-61.	23-26,28-31,33,35-40 ----- 32
Y --- A	US 6,197,683 B1 (KANG et al) 06 March 2001 (06.03.2001), see entire document	32 ----- 1-31,33-40
A	US 6,081,034 A (SANDHU et al) 27 January 2000 (27.01.2000), see entire document.	1-40
A	US 6,057,229 A (HIEBER et al) 02 May 2000 (02.05.2000), see entire document.	1-40
A	US 5,595,784 A (KAIM et al) 21 January 1997 (21.01.1997), see entire document.	1-40

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	
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"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	

Date of the actual completion of the international search
 30 June 2003 (30.06.2003)

Date of mailing of the international search report
21 JUL 2003

Name and mailing address of the ISA/US
 Mail Stop PCT, Attn: ISA/US
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 Facsimile No. (703) 305-3230

Authorized officer
 Trung Dang
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INTERNATIONAL SEARCH REPORT

PCT/US03/02217

Continuation of B. FIELDS SEARCHED Item 3:

EAST, EUROPATFULL, PCTFULL

search terms: titanium or ti, titanium nitride or tin, titanium silicide or disilicide or tisi2; puls? or cycl?