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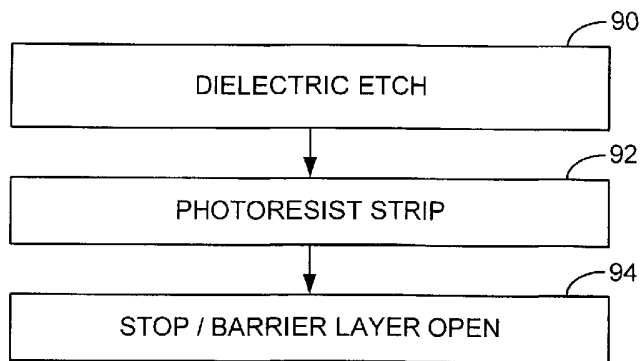
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: AN INTEGRATED IN-SITU ETCH PROCESS PERFORMED IN A MULTICHAMBER SUBSTRATE PROCESSING SYSTEM



(57) Abstract: An integrated in situ etch process performed in a multichamber substrate processing system having first and second etching chambers. In one embodiment the first chamber includes an interior surface that has been roughened to at least 100 Ra and the second chamber includes an interior surface that has a roughness of less than about 32 Ra. The process includes transferring a substrate having formed thereon in a downward direction a patterned photoresist mask, a dielectric layer, a barrier layer and a feature in the substrate to be contacted into the first chamber where the dielectric layer is etched in a process that encourages polymer formation over the roughened interior surface of the chamber. The substrate is then transferred from the first chamber to the second chamber under vacuum conditions and, in the second chamber, is exposed to a reactive plasma such as oxygen to strip away the photoresist mask deposited over the substrate. After the photoresist mask is stripped, the barrier layer is etched through to the feature to be contacted in the second chamber of the multichamber substrate processing system using a process that discourages polymer formation over the relatively smooth interior surface of the second chamber. All three etching steps are performed in a system level in situ process so that the substrate is not exposed to an ambient between steps. In some embodiments the interior surface of the first chamber has a roughness between 100 and 200 Ra and in other embodiments the roughness of the first chamber's interior surface is between 110 and 160 Ra.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L C23C G03F B44C

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 practical, search terms used)

EPO-Internal, WPI Data, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 211 092 B1 (DING JIAN ET AL) 3 April 2001 (2001-04-03) column 5, line 33 -column 14, line 62; claims; figures	1-8,10, 39
Y	US 2002/022281 A1 (LANG JOHN ET AL) 21 February 2002 (2002-02-21) abstract; claims	1-8,10, 39
A	US 2001/008226 A1 (DING JIAN ET AL) 19 July 2001 (2001-07-19)  page 1, paragraph 8 -page 7, paragraph 63; claims	1-8,10, 12-15, 22,24, 26,27, 30,31, 33,39-47

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 00 26954 A (APPLIED MATERIALS INC) 11 May 2000 (2000-05-11) the whole document ----	1, 12, 21, 25, 33, 39
A	US 5 902 704 A (SCHOENBORN PHILIPPE ET AL) 11 May 1999 (1999-05-11)  column 1, line 65 -column 6, line 19; claims; figure 6 ----	1, 9, 12, 21, 25, 33, 39, 47
A	EP 1 049 133 A (APPLIED MATERIALS INC) 2 November 2000 (2000-11-02) page 2, line 58 -page 5, line 21; claims ----	12, 25, 33, 47
A	US 6 296 988 B1 (LEE BOK-HYUNG) 2 October 2001 (2001-10-02) column 2, line 13 -column 3, line 13; claims 28-30 ----	1, 12, 25, 33, 39
A	EP 0 709 488 A (SHINETSU HANDOTAI KK) 1 May 1996 (1996-05-01)  column 2, line 25 -column 8, line 5; claims -----	1-4, 12, 25-27, 33, 39-42

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