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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
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(54) **Title:** COMPOSITIONS AND METHODS FOR SELECTIVELY ETCHING SILICON NITRIDE

(57) **Abstract:** Compositions useful for the selective removal of silicon nitride materials relative to silicon oxide materials from a microelectronic device having same thereon. The removal compositions include at least one alkoxy silane, at least one etchant, at least one oxidizing agent, at least one organic solvent, and water.

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2012/042925****A. CLASSIFICATION OF SUBJECT MATTER***C09K 13/00(2006.01)i, C09K 13/06(2006.01)i, C09K 13/08(2006.01)i, H01L 21/302(2006.01)i*

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)

C09K 13/00; C09K 13/08; H05K 3/00; C01B 33/107

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) &amp; keywords: etching, remove, silicon nitride, alkoxysilane, solvent, glycol, oxidizing agent, etchant

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010-0176082 A1 (COOPER, EMANUEL I. et al.) 15 July 2010 See abstract; paragraphs [0001], [0011]-[0027], [0039], [0051], [0052] and [0070]; claims 1-14.	1-4
Y		12
Y	KR 10-2009-0030702 A (HYNIX SEMICONDUCTOR INC. et al.) 25 March 2009 See abstract; paragraphs [0001] and [0017]-[0020]; claims 1 and 5.	12
A	WO 2009-073596 A2 (ADVANCED TECHNOLOGY MATERIALS, INC.) 11 June 2009 See abstract; paragraphs [0001] and [0002]; claims 1-3 and 6.	1-4, 12
A	US 6162370 A (HACKETT, THOMAS B. et al.) 19 December 2000 See abstract; column 2 lines 40-57; claim 1.	1-4, 12

 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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

13 FEBRUARY 2013 (13.02.2013)

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**14 FEBRUARY 2013 (14.02.2013)**

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/042925**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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