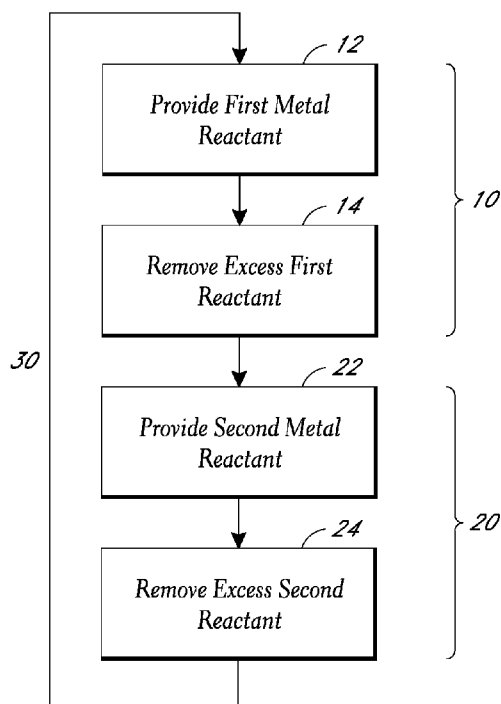




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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, 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.

[Continued on next page]

(54) Title: TERNARY METAL ALLOYS WITH TUNABLE STOICHIOMETRIES



(57) Abstract: Methods and equipment for forming ternary metal alloys are provided. In some embodiments, TaCN thin films are deposited by exposing a substrate to alternating pulses of an organometallic tantalum precursor comprising nitrogen and carbon and hydrogen plasma. The stoichiometry of the film is tuned from carbon rich to nitrogen rich by adjusting the plasma parameters, particularly the plasma intensity. In this way, films with varied characteristics can be formed from the same precursor. For example, both n-type and p-type materials can be deposited in the same module using the same precursor.

FIG. 1



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/055926**A. CLASSIFICATION OF SUBJECT MATTER*****H01L 21/205(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)

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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) & Keywords: deposit, reaction, condition, work-function, cycle, metal, carbide, plasma, hydrogen, exposing.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7064066 B1 (MATTHEW V. METZ et al.) 20 June 2006 See abstract, column 5, line 43-column 6, line 56, claims 1,7,15,17 and figures 2h,2i.	1-42
A	US 2009-0315093 A1 (DONG LI et al.) 24 December 2009 See abstract, paragraphs [0044]-[0051], claims 1-9,13,19-22 and figure 1.	1-42
A	US 2008-0113110 A1 (KAI-ERIK ELERS et al.) 15 May 2008 See abstract, claims 1,6,14,16,29,30,32 and figure 1.	1-42
A	US 2009-0280267 A1 (DONG LI et al.) 12 November 2009 See abstract, claims 1,3,5,9,24,30,31 and figures 4,5.	1-42

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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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PCT/US2011/055926

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