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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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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(54) **Title:** ALUMINUM ALLOYS HAVING IRON, SILICON, VANADIUM AND COPPER, AND WITH A HIGH VOLUME OF CERAMIC PHASE THEREIN

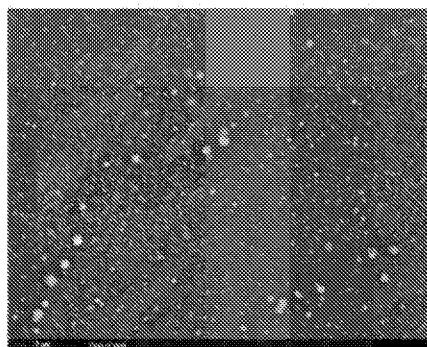


FIG.5A

(57) **Abstract:** New aluminum alloys having iron, vanadium, silicon, and copper, and with a high volume of ceramic phase therein are disclosed. The new products may include from 3 to 12 wt. % Fe, from 0.1 to 3 wt. % V, from 0.1 to 3 wt. % Si, from 1.0 to 6 wt. % Cu, from 1 to 30 vol. % ceramic phase, the balance being aluminum and impurities. The ceramic phase may be homogeneously distributed within the alloy matrix.



A. CLASSIFICATION OF SUBJECT MATTER**C22C 21/00(2006.01)i, C22C 21/14(2006.01)i, C22C 1/02(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)

C22C 21/00; C22F 3/00; B22D 17/00; F01L 1/14; C22C 1/05; C22C 1/04; B22F 3/105; C22C 21/14; C22C 1/02

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) & Keywords:aluminum alloy, Fe, V, Si, ceramic, aerospace, homogeneous structure, cellular structure, molten pool, powder

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 07-305132 A (SUMITOMO LIGHT METAL IND. LTD.) 21 November 1995 See paragraph [0012] and claim 1.	1-17
Y	JP 2732512 B2 (RIKEN CORPORATION) 30 March 1998 See page 6, left column, line 17-right column, line 10.	1-17
Y	US 2014-0271322 A1 (HONEYWELL INTERNATIONAL INC.) 18 September 2014 See paragraphs [0016]-[0017] and claims 1-6, 17.	3,9-17
A	KR 10-2011-0111486 A (ALCOA USA CORP.) 11 October 2011 See paragraphs [0122]-[0125].	1-17
A	US 2003-0183306 A1 (HEHMANN et al.) 02 October 2003 See paragraphs [0025]-[0032].	1-17

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

* Special categories of cited documents:

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"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

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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