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12/119,648 13 May 2008 (13.05.2008) US(71) Applicant (for all designated States except US): **UT-BATTELLE, LLC** [US/US]; P.O. Box 2008, One Bethel Valley Road, Oak Ridge, TN 37831 (US).(72) Inventor: **JUDKINS, Roddie, R.** (deceased).

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[Continued on next page]

(54) Title: FERRITIC ALLOY COMPOSITIONS, INTERCONNECTOR PLATE MADE THEREOF AND POROUS SUPPORT FOR A SOFC MADE THEREOF

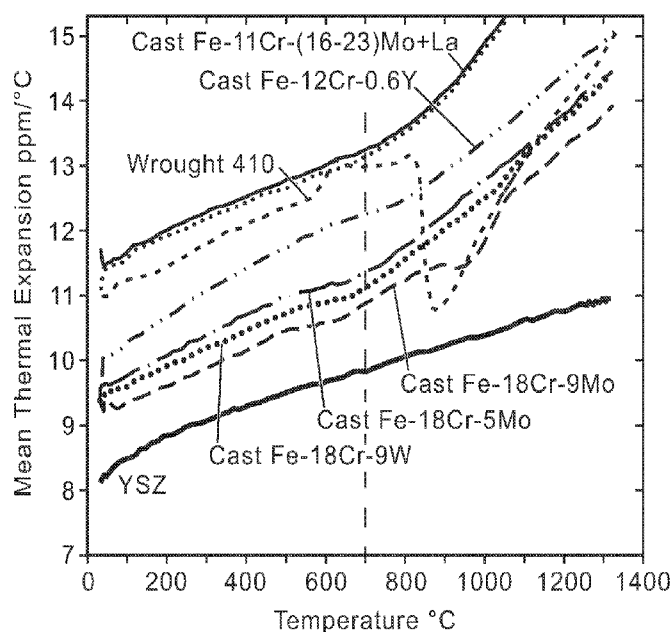


FIG. 1

(57) Abstract: The invention relates to a ferritic alloy composition. In one aspect, the ferritic alloy composition comprises about 16 to 20 wt. % Cr, about 7 to 11 wt. % Mo, and the balance Fe. In another aspect, the ferritic composition comprises about 10 to 14 wt. % Cr, about 7 to 11 wt. % Mo or about 10 to 20 wt. % W, and the balance Fe.



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *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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INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER

INV. C22C38/22

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

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, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/087250 A1 (LEWIS DANIEL J [US] ET AL) 19 April 2007 (2007-04-19) paragraphs [0023], [0025], [0026], [0028]; claims 1,12	1-13
A	EP 1 235 290 A2 (KAWASAKI STEEL CO [JP] JFE STEEL CORP [JP]) 28 August 2002 (2002-08-28) paragraphs [0056] - [0057]; claim 1; table 2 paragraph [0061]	1-13
A	US 2008/107947 A1 (JACKSON MELVIN [US] ET AL) 8 May 2008 (2008-05-08) paragraphs [0008] - [0010]; claim 1; table 1 paragraphs [0014] - [0015]; claims 1,6,8	1-13
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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 document 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 another citation or other special reason (as specified)

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"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

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"&" document member of the same patent family

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International application No

PCT/US2009/043764

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2006/105218 A1 (ISHIKAWA SHIN [JP] ET AL) 18 May 2006 (2006-05-18) paragraphs [0057] - [0061], [0071]; table 2 -----	1-13
A	CHURCH ET AL: "Thermal expansion matching and oxidation resistance of Fe-Ni-Cr interconnect alloys" MATERIALS SCIENCE AND ENGINEERING A: STRUCTURAL MATERIALS: PROPERTIES, MICROSTRUCTURE & PROCESSING, LAUSANNE, CH LNKD- DOI:10.1016/J.MSEA.2006.10.149, vol. 452-453, 16 March 2007 (2007-03-16), pages 334-340, XP005909258 ISSN: 0921-5093 paragraph [1. Introduction & 5. Conclusions] -----	1-13
A	UEDA M ET AL: "Thermal expansivity and high-temperature oxidation resistance of Fe-Cr-W alloys developed for a metallic separator of SOFC" FOURTH EUROPEAN SOLID OXIDE FUEL CELL FORUM. PROCEEDINGS,, vol. 2, 10 July 2000 (2000-07-10), pages 837-843, XP009131817 paragraph [I. Intro & IV. Conclusion] tables 1,2 -----	1-13
A	UEDA M ET AL: "Thermal expansivity and high-temperature oxidation resistance of Fe-Cr-W alloys" MATERIALS TRANSACTIONS. JIM, SENDAI, JP, vol. 40, no. 12, 1 December 1999 (1999-12-01), pages 1390-1395, XP009131816 ISSN: 0916-1821 paragraph [I. Intro & IV. Conclusion] tables 1,2 -----	1-13
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/043764

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2008/013498 A1 (SANDVIK INTELLECTUAL PROPERTY [SE]; TOPSOE FUEL CELL AS [DK]; SCHUISKY) 31 January 2008 (2008-01-31) page 5, paragraph Detailed description - page 8 tables 1-2	1-13
A	----- JP 2003 187828 A (NISSHIN STEEL CO LTD) 4 July 2003 (2003-07-04) abstract; figures 1-3; tables 1-2 -----	1-13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/043764

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-13(partially) see additional sheet(s)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-13(partially)

a ferritic alloy composition comprising chromium {16 to 20 wt%}, molybdenum {7 to 11 wt%}, the balance Iron

2. claims: 1-13(partially)

a ferritic alloy composition comprising chromium {10 to 14 wt%}, molybdenum {7 to 11 wt%}, tungsten {10 to 20 wt%}, the balance Iron

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/043764

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