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(54) Title: ECONOMICAL MANUFACTURING METHOD OF CR₂AlC SINTERED MATERIAL WITH EXCELLENT MACHINABILITY

(57) Abstract: The present invention relates to an economical manufacturing method of a machinable Cr₂AlC sintered material, and particularly to a process of preparing a Cr₂AlC sintered material, the process comprising (a) preparing chromium carbide powder comprising 95 vol % or more of Cr₇C₃ and Cr₃C₂ crystalline phase by conducting reduction of low-priced Cr₂O₃ powder with a carbon source powder and (b) hot-pressing a powder mixture of the chromium carbide and Al powder. In the present invention, low-priced Cr₂O₃ is used as a raw material, thus remarkably lowering the manufacture cost as compared to the conventional process. Moreover, Cr₂AlC sintered material prepared according to the present invention is similar to or even better than the Cr₂AlC fabricated by a conventional process in thermal, mechanical and electrical properties and machinability, and is thus capable of widening the applications of Cr₂AlC sintered material as a structural material in industry.



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A. CLASSIFICATION OF SUBJECT MATTER*C04B 35/56(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)

IPC C04B

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 practicable, search terms used)

eKOMPASS(KIPO internal)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| A | KR 10-2004-0030683 A(Sand-Vik AB, Drexel University) 9 Apr. 2004 See Abstract, and Claim 1 | 1-8 |
| A | JP 03-232765 A(Kurosaki Refract Co., Ltd., Nippon Steel Corp.) 16 Oct. 1991 See Abstract, and Claim 1 | 1-8 |
| A | KR 10-0276109 B1(Won, Chang Whan, Ko, Jae Mun) 15 Dec. 2000 See Abstract, and Claim 1 | 1-8 |

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

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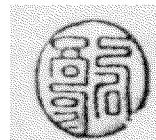
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| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|--|------------------|-------------------------|------------------|
| KR 10-2004-0030683 A | 09.04.2004 | KR 0831244 B1 | 15.05.2008 |
| | | CN 1538944 C0 | 20.10.2004 |
| | | CN 1538944 A | 20.10.2004 |
| | | CN 1295190 C | 17.01.2007 |
| | | EP 1397325 A1 | 17.03.2004 |
| | | JP 2004-532788 A | 28.10.2004 |
| | | JP 04-045239 B2 | 22.11.2007 |
| | | TW 567168 A | 21.12.2003 |
| | | US 069806873 B2 | 17.01.2006 |
| | | US 2004-0156772 A1 | 12.08.2004 |
| | | WO 2003-000618 A1 | 03.01.2003 |
| JP 03-232765 A | 16.10.1991 | None | |
| KR 10-0276109 B1 | 15.12.2000 | KR 10-2000-0025717 A | 06.05.2000 |