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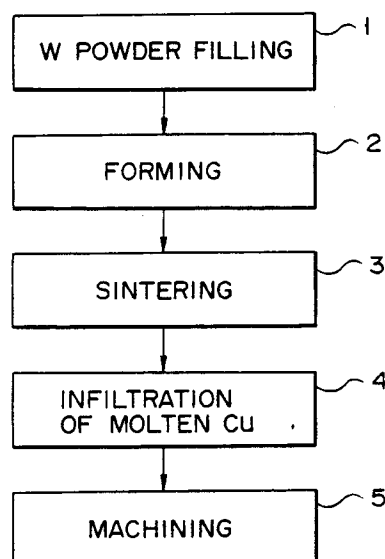
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**30.06.93 Bulletin 93/26**(71) Applicant: **Kabushiki Kaisha Toshiba  
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Möhlstrasse 37  
W-8000 München 80 (DE)**(54) **Fabricating method of composite material, and heat conductive material and fabricating method of heat conductive material.**

(57) In order to obtain a composite material excellent in the bonding strength (adhesion) of two materials and thermal conductivity, the invention presents a fabricating method of a composite material by compounding a high melting material W and a low melting material Cu, which comprises, a first step (1, 2, 3) of forming pores in the high melting material W, having the porosity distribution so that the porosity may be large at least in part of the surface thereof and that the porosity may gradually increase toward that part, and a second step (4) of infiltrating the low melting material Cu from the large porosity part of the material obtained in the first step (1, 2, 3), wherein the composition ratio of the high melting material and low melting material is in a gradient distribution.

**FIG. 1****EP 0 446 934 A3**



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-A-2 450 361 (P.R.MALLORY & CO. INC.) 24 April 1975 * page 5, line 15 - page 7, line 22 * ---	1-8	B22F3/26 B22F3/10 F28F13/00 // C23C4/02 C23C4/18
X	EP-A-0 250 210 (THE REGENTS UNIVERSITY OF CALIFORNIA) 23 December 1987 * page 5, line 8 - line 14 * * claims 1,17 * ---	1-8	
X	DE-A-3 724 995 (RANDEX-HERAKLITH INDUSTRIEBETEILUNGS AG) 8 September 1988 * claims * ---	1-8	
A	US-A-4 803 046 (HAUSSELT ET AL) 7 February 1989 * claim 1 * ---	1	
A	INSPEC Database, The Institution of Electrical Engineers, Herts, GB AN-521781 * abstract * & METALLOGRAPHY vol. 6, no. 2, April 1973, USA pages 155 - 169 CHAWLA 'Thermal cycling of copper-tungsten fiber composites: a metallographic study' ---	9	TECHNICAL FIELDS SEARCHED (Int. Cl.5)  B22F F28F C23C C22C
A	DE-C-3 907 625 (MTU MOTOREN- UND TURBINEN-UNION MÜNCHEN GMBH) 15 February 1990 * claims * ---	10,11	
A	EP-A-0 342 992 (TOSOH CORPORATION) 23 November 1989 * claims 1,3,4 * --- -/--	10	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 APRIL 1993	Examiner RIBA VILANOVA M.
<b>CATEGORY OF CITED DOCUMENTS</b>  X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document  T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			



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DOCUMENTS CONSIDERED TO BE RELEVANT															
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)												
A	INSPEC Database, The Institution of Electrical Engineers, Herts, GB AN-1485501 * abstract * & POWDER METALLURGY INTERNATIONAL vol. 11, no. 3, August 1979, DE pages 115 - 119 DE MEESTER 'Isostatically compacted metal fibre porous coatings for bone ingrowth'  -----	10													
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)												
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Place of search THE HAGUE		Date of completion of the search 23 APRIL 1993	Examiner RIBA VILANOVA M.												
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