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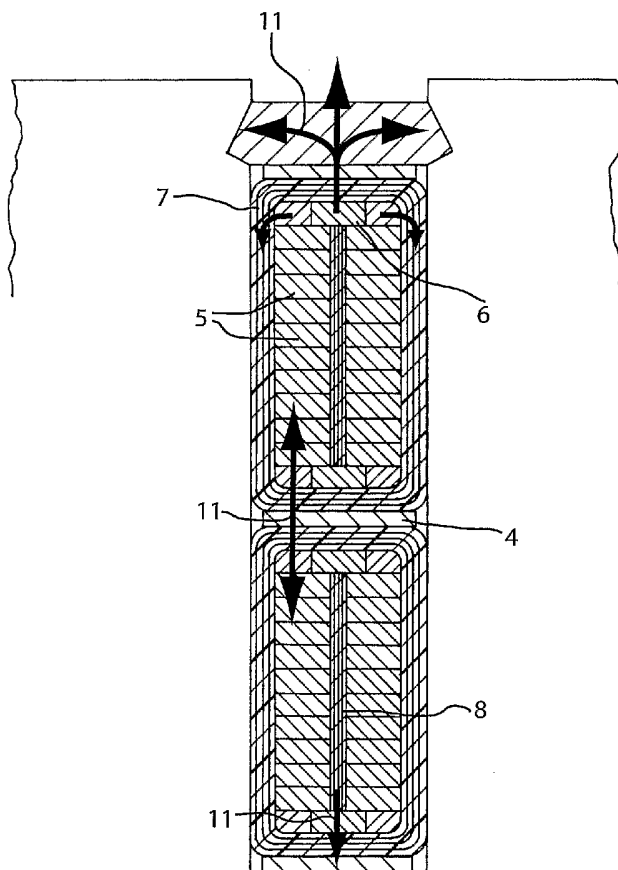
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[Continued on next page]

(54) Title: HIGH THERMAL CONDUCTIVITY MATERIALS INCORPORATED INTO RESINS



(57) Abstract: In one embodiment the present invention provides for a high thermal conductivity resin that comprises a host resin matrix 32 and a high thermal conductivity filler 30. The high thermal conductivity filler forms a continuous organic-inorganic composite with the host resin matrix, and the high thermal conductivity fillers are from 1-1000 nm in length and have an aspect ratio of between 3-100.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER HO1B3/00 C08L101/00 C08K3/00 C08K7/00				
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) HO1B C08L C08K				
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, CHEM ABS Data, WPI Data, PAJ				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 03/040445 A (SHOWA DENKO K.K; YAMAMOTO, RYUJI; MORITA, TOSHIO) 15 May 2003 (2003-05-15) page 1, lines 26-31; examples 1-3	1,2		
A	DATABASE CA 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; SHIBATA, YASUFUMI ET AL: "Lipophilic inorganic-organic hybrid materials with low frictional coefficient useful for sliding parts such as piston rings" XP002355912 retrieved from STN Database accession no. 2002:568167 abstract ---	1-15		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. </td> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> Patent family members are listed in annex. </td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.	<input checked="" type="checkbox"/> Patent family members are listed in annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.	<input checked="" type="checkbox"/> Patent family members are listed in annex.			
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<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> *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) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; border: none; vertical-align: top;"> *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 </td> </tr> </table>			*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) *O* document referring to an oral disclosure, use, exhibition or other means *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 *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
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) *O* document referring to an oral disclosure, use, exhibition or other means *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 *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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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Pollio, M			

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2005/021116

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	& JP 2002 212422 A2 (TOYOTA MOTOR CORP., JAPAN; NIPPON STEEL CORP.) 31 July 2002 (2002-07-31) -----	
A	EP 1 220 240 A (HITACHI, LTD) 3 July 2002 (2002-07-03) paragraphs '0008!, '0033! -----	1-24
A	EP 0 266 602 A (ASEA AB) 11 May 1988 (1988-05-11) example 1 -----	1-24
P,A	WO 2004/067606 A (SUZUKA FUJI XEROX CO., LTD; SHINDO, TAKUYA) 12 August 2004 (2004-08-12) abstract -----	1-24

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No PCT/US2005/021116
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Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
WO 03040445	A	15-05-2003	NONE	
JP 2002212422	A2	--	--	
EP 1220240	A	03-07-2002	WO 0116965 A1	08-03-2001
EP 0266602	A	11-05-1988	CA 1289610 C	24-09-1991
			DE 3784008 D1	18-03-1993
			DE 3784008 T2	24-06-1993

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No PCT/US2005/021116

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0266602 A		JP 63110929 A SE 455246 B SE 8604509 A US 4806806 A	16-05-1988 27-06-1988 23-04-1988 21-02-1989
WO 2004067606 A	12-08-2004	JP 2004250665 A	09-09-2004