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(54) Title: SILANE COMPOSITIONS, PROCESSES FOR THEIR PREPARATION AND RUBBER COMPOSITIONS CONTAINING SAME

(57) Abstract: Silane compositions of the general formula are provided herein comprising  $[(RO)_x(R^1)_{(3-x)} - Si - M]_q - L - [(R^a)_c Ar - (CR^2 = CR^2)_y]_z$  wherein R and R<sup>1</sup> are independently a hydrocarbon group of from 1 to about 20 carbon atoms; R<sup>2</sup> are each independently hydrogen or a hydrocarbon group of from 1 to about 20 carbon atoms; M optionally is a divalent hydrocarbon connecting group of from 1 to about 20 carbon atoms to link the silicon atom and the L group; L is a covalently bound hydrocarbon linking group of from 1 to about 20 carbon atoms or a heteroatom linking group selected from the group consisting of -O-, -S-, NR<sup>3</sup>- wherein R<sup>3</sup> is hydrogen or a hydrocarbon group of from 1 to about 20 carbon atoms; R<sup>a</sup> is an alkyl group of 1 to 12 carbon atoms; Ar is a substituted or unsubstituted aromatic group; q is an integer of 1 to 4; t and c are each independently 0 or 1; and x, y and z are each independently integers of 1 to 3, inclusive, with the proviso that t is 1 when L is a heteroatom group. Also provided are processes for preparing the silane compositions and rubber composition comprising the silane compositions.

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<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) C07F C08K		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
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<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 326 895 A (KUBOTA ET AL) 5 July 1994 (1994-07-05) column 3, lines 14-20; claims 1-17 -----	1-69
X	US 3 956 353 A (PLUEDDEMANN ET AL) 11 May 1976 (1976-05-11) column 7, lines 20ff., first two amines column 4, line 40 -----	1-69
X	DE 20 50 467 A1 (DOW CORNING CORP., MIDLAND, MICH.) 13 May 1971 (1971-05-13) claims 1-3; compounds 11-13 -----	1-69
X	WO 99/20682 A (N.V. BEKAERT S.A.; DECLERCQ, DRIES; VANBRABANT, JOHAN; MAUER, DANIEL; G) 29 April 1999 (1999-04-29) example 2 -----	1-69
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents :		
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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  <p style="text-align: center; font-weight: bold;">Stroeter, T</p>	

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 008, no. 018 (P-250), 26 January 1984 (1984-01-26) & JP 58 176538 A (SHARP KK), 17 October 1983 (1983-10-17) the whole document -----	1-69
X	TENG, ZHU ET AL: "Palladium-induced intramolecular coupling reactions of some alkenyl(2-iodobenzyl)silanes" HELVETICA CHIMICA ACTA, 82(4), 515-521 CODEN: HCACAV; ISSN: 0018-019X, 1999, XP002372297 compounds 6A-C -----	1-69
X	EP 0 097 516 A (JAPAN SYNTHETIC RUBBER CO., LTD) 4 January 1984 (1984-01-04) example 11 -----	1-69
A	US 2002/016487 A1 (KAYSER FRANCOIS ET AL) 7 February 2002 (2002-02-07) claims 1-29 -----	1-69
A	US 2001/009966 A1 (WUNSCH JOSEF ET AL) 26 July 2001 (2001-07-26) paragraphs [0024], [0112]; claims 1-6 -----	1-69
A	US 3 971 883 A (MEEKS ET AL) 27 July 1976 (1976-07-27) column 2, line 24 - line 37 -----	1-69

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/026580

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5326895	A	05-07-1994	NONE	
US 3956353	A	11-05-1976	AT 339332 B	10-10-1977
			AT 894574 A	15-02-1977
			BE 824644 A1	22-07-1975
			CA 1041532 A1	31-10-1978
			CH 609351 A5	28-02-1979
			DE 2452690 A1	29-01-1976
			FR 2278699 A1	13-02-1976
			GB 1436997 A	26-05-1976
			IT 1025526 B	30-08-1978
			JP 56039094 A	14-04-1981
			JP 1075773 C	25-12-1981
			JP 51008249 A	23-01-1976
			JP 56018038 B	25-04-1981
			NL 7414283 A	19-01-1976
			SE 7413418 A	16-01-1976
			ZA 7407099 A	26-11-1975
DE 2050467	A1	13-05-1971	NONE	
WO 9920682	A	29-04-1999	AU 9524798 A	10-05-1999
			ZA 9809418 A	19-04-1999
JP 58176538	A	17-10-1983	JP 1372555 C	07-04-1987
			JP 61040322 B	09-09-1986
EP 0097516	A	04-01-1984	DE 3380442 D1	28-09-1989
US 2002016487	A1	07-02-2002	US 6353045 B1	05-03-2002
US 2001009966	A1	26-07-2001	NONE	
US 3971883	A	27-07-1976	BE 846077 A1	10-03-1977