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(54) Title: METHOD FOR PRODUCTION OF NANOFIBRES FROM FLUORINATED COPOLYMERS AND TERPOLYMERS THROUGH ELECTROSTATIC SPINNING, NANOFIBRES AND FABRICS

(57) Abstract: The invention relates to the method for production of nanofibres from fluorated copolymers and terpolymers through electrostatic spinning. The fluorated copolymer or terpolymer is before spinning dissolved in solvent system on basis of a mixture of liquid amide (e. g. DMF, DMAc, HMPA, N-methylpyrrolidone) or DMSO and aliphatic ketone with maximum of ten atoms of carbon in molecule and this solution is brought into the electrostatic field between a spinning electrode and a collecting electrode.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER INV. D01D5/00 D01F6/32 D01F1/09		
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) D01D D01F		
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, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Week 200833 Thomson Scientific, London, GB; AN 2008-E72586 XP002547886 & CN 101 069 821 A (UNIV TIANJIN) 14 November 2007 (2007-11-14)	1-3, 5-10, 13-14, 19-23
Y	abstract	4, 11-12, 15-18
Y	----- GB 1 431 697 A (TEIJIN LTD) 14 April 1976 (1976-04-14) page 4, line 65 - line 92 -----	4
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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.		
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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.
Y	<p>YEE; KOTAKI W A; LIU M; LU Y; X: "Morphology, polymorphism behavior and molecular orientation of electrospun poly(vinylidene fluoride) fibers" POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, vol. 48, no. 2, 18 January 2007 (2007-01-18), pages 512-521, XP005824207 ISSN: 0032-3861 page 517, paragraph 3.4</p>	11-12
Y	<p>WO 2006/131081 A1 (ELMARCO S R O [CZ]; PETRAS DAVID [CZ]; MARES LADISLAV [CZ]; STRANSKA D) 14 December 2006 (2006-12-14) cited in the application claims; figures</p>	15-16
Y	<p>WO 2008/028428 A1 (ELMARCO S R O [CZ]; PETRAS DAVID [CZ]; MALY MIROSLAV [CZ]; POZNER JAN) 13 March 2008 (2008-03-13) cited in the application claims; figures</p>	17-18
X	<p>WO 2006/089531 A2 (UNIV MARBURG PHILIPPS [DE]; GREINER ANDREAS [DE]; AGARWAL SEEMA [DE];) 31 August 2006 (2006-08-31) examples 1-5; table 1</p>	1,5-10, 13-14, 17,19, 21-23
X	<p>WO 2007/013858 A1 (UNIV SINGAPORE [SG]; TEO WEE EONG [SG]; FUJIHARA KAZUTOSHI [SG]; RAMAK) 1 February 2007 (2007-02-01) example 1</p>	1-3, 5-10, 13-14, 17,19-23
X	<p>US 2002/100725 A1 (LEE WHA SEOP [KR]; JO SEONG MU [KR]; CHUN SUK WON [KR]; CHOI SUNG WON) 1 August 2002 (2002-08-01) paragraph [0029] - paragraph [0035] examples 4,9,11 claims</p>	1-3, 5-10, 13-14, 19-23
T	<p>WANG M; VAIL S A; KEIRSTEAD A E; MARQUEZ M; GUST D; GARCIA A A: "Preparation of photochromic poly(vinylidene fluoride-co-hexafluoropropylene) fibers by electrospinning" POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, vol. 50, no. 16, 31 July 2009 (2009-07-31), pages 3974-3980, XP026351544 ISSN: 0032-3861 [retrieved on 2009-06-26]</p>	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/CZ2009/000048

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CN 101069821	A	14-11-2007	NONE	
GB 1431697	A	14-04-1976	DE 2320705 A1 FR 2181967 A1 NL 7305569 A	15-11-1973 07-12-1973 24-10-1973
WO 2006131081	A1	14-12-2006	AU 2006255403 A1 CA 2608230 A1 CN 101189368 A CZ 299537 B6 EA 200800981 A1 EP 1910591 A1 JP 2008542571 T KR 20080017452 A US 2008307766 A1	14-12-2006 14-12-2006 28-05-2008 27-08-2008 29-08-2008 16-04-2008 27-11-2008 26-02-2008 18-12-2008
WO 2008028428	A1	13-03-2008	AU 2007294306 A1 CA 2661641 A1 CN 101512052 A CZ 299549 B6 EP 2059630 A1 KR 20090054987 A	13-03-2008 13-03-2008 19-08-2009 27-08-2008 20-05-2009 01-06-2009
WO 2006089531	A2	31-08-2006	DE 102005008927 A1 EP 1851266 A2 EP 2048187 A1 US 2009010870 A1	31-08-2006 07-11-2007 15-04-2009 08-01-2009
WO 2007013858	A1	01-02-2007	NONE	
US 2002100725	A1	01-08-2002	CN 1367276 A JP 2002249966 A KR 20020063020 A	04-09-2002 06-09-2002 01-08-2002