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(54) Title: HYBRID MATERIAL CONTAINING SILVER NANOPARTICLES, METHOD FOR OBTAINING THE SAME AND USE THEREOF

(57) Abstract: The hybrid material is composed of calcium carbonate microparticles with the polyelectrolyte additive and silver nanoparticles (nAg) embedded in its structure. The process of making of the hybrid material comprises of ultrasound-assisted coprecipitation of calcium carbonate in aqueous medium in the presence of polyelectrolyte and in the presence of silver nanoparticles (nAg). The hybrid material can be used as an antibacterial and antifungal agent, especially to protect goose down feathers from negative influence of microorganisms.



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A. CLASSIFICATION OF SUBJECT MATTER INV. AOIPI/00 A01N25/08 A01N59/16 A01N25/24 ADD.		
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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	NAVARRO E ET AL: "Toxi city of Silver Nanoparti cles to Chl amydomonas rei nhardt i", ENVI RONMENTAL SCI ENCE AND TECHNOLOGY, AMERICAN CHEMICAL SOCI ETY. EASTON, PA, US, vol . 42, no. 23, 1 January 2008 (2008-01-01) , pages 8959-8964, XP007921078, ISSN: 0013-936X, DOI: 10. 1021/ES801785M [retri eved on 2008-01-10] the whol e document -----	1-4, 9-24, 29-32
X	US 2006/204738 AI (DUBROW ROBERT S [US] ET AL) 14 September 2006 (2006-09-14) the whol e document ----- -/- .	1-32
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
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INTERNATIONAL SEARCH REPORT

International application No
PCT/PL2012/000035

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	wo 2007/004767 AI (HAN SANG WOOK [KR]) 11 January 2007 (2007-01-11) the whole document -----	1-32
X	wo 2008/128896 A2 (CIBA HOLDING INC [CH] ; PREUSS ANDREA [CH] ; STODDEN BARBARA [DE] ; PETER) 30 October 2008 (2008-10-30) the whole document -----	1-32
X	US 2009/205116 AI (STONE JOSHUA J [US] ET AL) 20 August 2009 (2009-08-20) the whole document -----	1-32
X	wo 2011/015429 A2 (DSM IP ASSETS BV [NL] ; LOONTJENS JACOBUS [NL] ; VRINZEN ALEXANDER PETER) 10 February 2011 (2011-02-10) the whole document -----	1-32
X	US 2010/210465 AI (LI FUGANG [CA] ET AL) 19 August 2010 (2010-08-19) the whole document -----	1-32
X	JP 4 142349 A (SANGI KK) 15 May 1992 (1992-05-15) the whole document -----	1-32
X	TANMAY BERA ET AL: "Morphol ogi cal changes in biomimeti cal ly synthesi zed hydroxyapati te and silver nanoparti cles for medi cal appl i cati ons" , JOURNAL OF MATERIALS SCI ENCE, KLUWER ACADEMIC PUBLISHERS, BO, vol . 44, no. 9, 5 September 2008 (2008-09-05) , pages 2264-2270, XP019679383 , ISSN: 1573-4803 the whole document -----	1-32

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/PL2012/000035

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006204738	A l	14-09-2006	EP 1869237 A2 26-12-2007
		US 2006204738 A l	14-09-2006
		US 2011201984 A l	18-08-2011
		W0 2007078304 A2	12-07-2007
W0 2007004767	A l	11-01-2007	CN 101218167 A 09-07-2008
		KR 20070002481 A	05-01-2007
		W0 2007004767 A l	11-01-2007
W0 2008128896	A2	30-10-2008	AU 2008240809 A l 30-10-2008
		CA 2682509 A l	30-10-2008
		CN 101677575 A	24-03-2010
		EP 2136645 A2	30-12-2009
		JP 2010525091 A	22-07-2010
		KR 20100016595 A	12-02-2010
		US 2010136073 A l	03-06-2010
		W0 2008128896 A2	30-10-2008
US 2009205116	A l	20-08-2009	AU 2009222607 A l 24-06-2010
		CN 101746084 A	23-06-2010
		FR 2939356 A l	11-06-2010
		JP 2010179649 A	19-08-2010
		KR 20100065069 A	15-06-2010
		US 2009205116 A l	20-08-2009
W0 2011015429	A2	10-02-2011	CA 2763739 A l 10-02-2011
		CN 102469795 A	23-05-2012
		EP 2461676 A2	13-06-2012
		ES 2393252 T3	19-12-2012
		JP 2013501018 A	10-01-2013
		KR 20120052271 A	23-05-2012
		TW 201108937 A	16-03-2011
		US 2012171271 A l	05-07-2012
		W0 2011015429 A2	10-02-2011
US 2010210465	A l	19-08-2010	AU 2009295586 A l 01-04-2010
		CA 2737452 A l	01-04-2010
		CN 102223790 A	19-10-2011
		EP 2348834 A l	03-08-2011
		JP 2012503642 A	09-02-2012
		KR 20110066952 A	17-06-2011
		US 2010210465 A l	19-08-2010
		US 2012065071 A l	15-03-2012
		W0 2010035118 A l	01-04-2010
JP 4142349	A	15-05-1992	