

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 June 2006 (29.06.2006)

PCT

(10) International Publication Number
WO 2006/069236 A3

(51) International Patent Classification:

A61K 8/22 (2006.01) A61K 8/81 (2006.01)
A61K 8/42 (2006.01) A61Q 11/00 (2006.01)
A61K 8/73 (2006.01) A61K 8/86 (2006.01)

(21) International Application Number:

PCT/US2005/046577

(22) International Filing Date:

21 December 2005 (21.12.2005)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/638,835 21 December 2004 (21.12.2004) US

(71) Applicants (for all designated States except US):
CORIUM INTERNATIONAL, INC. [US/US]; 2686
MIDDLEFIELD ROAD, Suite G, Redwood City, Cali-
fornia 94063 (US). **A.V. TOPCHIEV INSTITUTE OF**
PETROCHEMICAL SYNTHESIS [RU/RU]; RUS-
SIAN ACADEMY OF SCIENCES, 29, Leninsky Prosp.,
Moscow, 117912 (RU).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SINGH, Parmin-
der** [US/US]; 32404 Pacific Grove Court, Union City,
California 94587 (US). **LEE, Eun, Soo** [US/US]; 2575
Hampton Avenue, Redwood City, California 94062 (US).
SAGI, Appala [IN/US]; 146 MADISON AVENUE, No.
6, Redwood City, California 94061 (US). **FELDSTEIN,
Mikhail, M.** [RU/RU]; LENINSKY PROSPEKT 102,
Apt. 145, Moscow, 119415 (RU). **BAIRAMOV, Danir,
F.** [RU/US]; 257 ARRIBA DRIVE, No. 1, Sunnyvale,
California 94086 (US).

(74) Agents: **ROSE, Flavio, M.** et al.; Mintz Levin Cohn Ferris
Glovsky and Popeo, P.C., 1400 Page Mill Road, Palo Alto,
CA 94304-1124 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV,
LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI,
NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG,
SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US,
UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,
RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

(88) Date of publication of the international search report:
8 September 2006

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: SUSTAINED RELEASE TOOTH WHITENING FORMULATIONS AND SYSTEMS

(57) Abstract: A tooth whitening composition comprises a mixture of tooth whitening agents, with a first whitening agent selected so as to release peroxide gradually upon contact with moisture and produce an alkaline pH, and a second whitening agent selected so as to release peroxide rapidly upon contact with moisture, and a water-swella-
ble, water-insoluble polymer.

WO 2006/069236 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/046577

A. CLASSIFICATION OF SUBJECT MATTER INV. A61K8/22 A61K8/42 A61K8/73 A61K8/81 A61Q11/00 A61K8/86		
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) A61K		
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	US 2003/235549 A1 (SINGH PARMINDER ET AL) 25 December 2003 (2003-12-25) page 2, paragraph 21 - page 3, paragraph 32	37, 38
Y	claims 1-38; examples 1-11 -----	2-36
Y	US 2002/106335 A1 (ORLOWSKI JAN A ET AL) 8 August 2002 (2002-08-08)	2-36
X	page 1, paragraph 6 - paragraph 12 page 2, paragraph 21 page 3, paragraph 26 - paragraph 37 claims; examples 1-6 -----	1
A	US 2003/180229 A1 (KOSTI CARL M) 25 September 2003 (2003-09-25) page 1, paragraph 10 - page 2, paragraph 24; examples 1-14; table 1 ----- -/--	1-38
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents :		
"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	
Date of the actual completion of the international search 28 April 2006	Date of mailing of the international search report 26. 07. 2006	
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 Loloiu, C	

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2005/046577

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 511 782 A (PERIO PRODUCTS LTD; KARIV, RAMI; PERIO PRODUCTS LIMITED) 4 November 1992 (1992-11-04) page 4, line 6 - line 35; claims; examples -----	1-38
A	US 2001/021374 A1 (MONTGOMERY R. ERIC) 13 September 2001 (2001-09-13) page 2, paragraph 15 - page 4, paragraph 37 page 4, paragraph 39 - paragraph 40; claims 1-4; table 5 -----	1-38
A	WO 97/11676 A (MONTGOMERY, ROBERT, ERIC) 3 April 1997 (1997-04-03) page 4, line 14 - line 22 page 6, line 27 - page 7, line 21; claims; tables 1-3 -----	1-38

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2005/046577

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 1
because they relate to subject matter not required to be searched by this Authority, namely:
Although claim 1 is directed to the presentation of an information, the search has been carried out and based on the alleged effects of the composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-38

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-38

Claims 1-36 directed to a tooth whitening composition comprising an admixture of (a) a first whitening agent that is inert in a dry environment and activated in contact with moisture to release hydrogen peroxide and produce an alkaline pH;

(b) a second whitening agent that is inert in a dry environment and activated in contact with aqueous base;

(c) a water-swellaable, water-insoluble polymer.

Claims 37 to 38 directed to a tooth whitening composition comprising:

(a) a tooth whitening agent that is inert in a dry environment and activated in contact with moisture;

(b) a mixture of a cationic and anionic water-insoluble, water-swellaable polymers.

2. claims: 39-45

Are directed to a tooth whitening composition comprising:

(a) 1.5 to 30% of a hydrophilic polymer composed of a covalently crosslinked hydrophilic polymer and a blend of a hydrophilic polymer and a complementary oligomer capable of hydrogen bonding;

(b) 40 to 90% of a water-swellaable, water-insoluble polymer;

(c) one tooth whitening agent;

3. claims: 48-55

Are directed to a flexible tooth whitening strip, comprising:

(a) a permeable outer layer comprised of an hydrophobic polymer and containing 1 to 30% of one tooth whitening agent;

(b) an interior adhesive layer composed of a polymeric matrix containing 1 to 50% of at least one tooth whitening agent.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2005/046577

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2003235549	A1	25-12-2003	US 2004105834 A1 US 2005113510 A1	03-06-2004 26-05-2005
US 2002106335	A1	08-08-2002	NONE	
US 2003180229	A1	25-09-2003	NONE	
EP 0511782	A	04-11-1992	AT 174787 T AU 656954 B2 AU 1511692 A CA 2066917 A1 DE 69227941 D1 DE 69227941 T2 DE 511782 T1 ES 2053412 T1 GR 94300050 T1 HU 65094 A2 IL 97930 A JP 6128130 A PL 294308 A1 RU 2106136 C1 TW 436290 B US 5425953 A ZA 9202940 A	15-01-1999 23-02-1995 29-10-1992 24-10-1992 04-02-1999 26-08-1999 22-09-1994 01-08-1994 31-08-1994 28-04-1994 18-06-1996 10-05-1994 08-02-1993 10-03-1998 28-05-2001 20-06-1995 28-04-1993
US 2001021374	A1	13-09-2001	US 6221341 B1	24-04-2001
WO 9711676	A	03-04-1997	AT 232715 T AU 7245596 A CA 2238764 A1 DE 69626297 D1 DE 69626297 T2 EP 0862408 A1	15-03-2003 17-04-1997 03-04-1997 27-03-2003 11-12-2003 09-09-1998