PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	05 MAR 2010
Applicant's or agent's file reference 21122.0043P1	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US 09/69652	29 December 2009 (29.12.2009)	29 December 2008 (29.12.2008)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - A01N 55/02; A61K 31/555 (2010.01)
USPC - 514/184-185

Applicant THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	23 February 2010 (23.02.2010)	Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

      ☐ on paper

      ☐ in electronic form

   b. (time)

      ☐ in the international application as filed

      ☐ together with the international application in electronic form

      ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

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Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-24, 25a-33a, 25b-33b and 34-155	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-24, 25a-33a, 25b-33b and 34-155	NO
Industrial applicability (IA)	Claims	1-24, 25a-33a, 25b-33b and 34-155	YES
	Claims	NONE	NO

2. Citations and explanations:

Claims 1-24, 25a-33a, 25b-33b and 34-60 lack an inventive step under PCT Article 33 (3) as being obvious over US 2007/0093462 A1 to Rogers et al. (hereafter 'Rogers').

Regarding claims 1-2, 17 and 20, Rogers teaches the method for preparing a bioactive ionic liquid composition, comprising (abstract; para [0097]): a) providing one or more cations and one or more anions, wherein either the cations, anions, or both can have a bioactive property (para [0086]) and b) combining the cations and anions, thereby producing a ionic liquid that is liquid at a temperature at or below about 150C (para [0100]; claim 23). Rogers does not specifically teach the co-ionic liquid or liquid ion pairs of formula [B1HB2]A or B[A1HA2]. However, Rogers does teach combining one of more oppositely charged ions (anions and cations) (para [0094]; [0100]) and various combinations of cations and anions and their associated properties (para [0097]). Therefore, it would have been obvious to one of skill in the art to identify the combination involving co-ionic liquid of formulae [B1HB2]A or B[A1HA2] at a desired percent level based on the particular weight/combination of cation or anion chosen, wherein B, B1, and B2 represent cations, and A, A1, and A2 represent anions.

Regarding claims 3-7, see the discussion set forth above as to claims 1-2. In addition, it would have been obvious to one of skill in the art to optimize the desired ion pair based on the amount of cationic and anionic precursor chosen and such optimization could be achieved by routine experimentation.

Regarding claim 8, Rogers teaches the method for preparing a bioactive ionic liquid composition, comprising: a) providing one or more of cations and one or more anions, wherein either the cations, anions, or both can have a bioactive property (para [0086]); and b) combining in the presence of one or more solvents the cations and anions (para [0083]), thereby producing a solvate ionic liquid (para [0083]); and wherein the composition is composed entirely of ions (para [0399]). Rogers does not specifically teach wherein at least a portion of the solvent provides direct solvation. However, Rogers does teach ionic liquid composition can be liquid solvate and not solution (para [0083]). Therefore, it would have been obvious to one of skill in the art to recognize that at least a portion of the solvent provide direct salvation.

Regarding claim 9, Rogers teaches the method according to Claim 8, wherein water is used as the solvent (para [0083]).

Regarding claim 10, Rogers teaches the method according to Claim 1, wherein co-ionic liquids are formed by the addition of an acid or a base (para [0094]).

Regarding claim 11, see the discussion set forth above as to claim 1. In addition, Rogers teaches the method according to Claim 1, wherein co-ionic liquids are formed by adding either a corresponding acid HA or corresponding base B to an ionic liquid having the formula [BH]A, wherein further HA is the free acid form of the anions or anion precursors, and B is the free base form of the cations or cation precursors (para [0094]; [0367]).

Regarding claim 12, see the discussion set forth above as to claim 1. In addition, Rogers teaches the method according to Claim 1, wherein ionic liquids are formed by adding a corresponding acid HA to an non-protic ionic liquid having the formula B+A-, wherein further HA is the free acid form of the anions or anion precursors (para [0094]; [0367]).

Regarding claim 13, see the discussion set forth above as to claim 1. In addition, Rogers teaches the method according to Claim 1, wherein ionic liquids are formed by adding either an acid HA1 or a base B2 to an ionic liquid having the formula [BH]A, wherein further HA1 is a different acid that the acid which forms ionic liquid [BH]A, and B2 is a different base than the base which forms ionic liquid [BH]A (para [0094]; [0367]).

Regarding claim 14, see the discussion set forth above as to claim 1. In addition, Rogers teaches the method according to Claim 1, wherein ionic liquids are formed by adding either an acid HAl to an non-protic ionic liquid having the formula B+ A-, wherein further HAl is a different acid that the acid which forms ionic liquid B+A- (para [0094]; [0367).

Regarding claim 15, see the discussion set forth above as to claim 1. In addition, Rogers teaches the method according to Claim 1, wherein the ionic liquid is formed by addition of an acid or a base to an ionic liquid [BH]A (para [0094]; [0367]), but does not specifically teach in a solvent-free synthesis in the molten state or by grinding. Since Rogers teaches solvent involved ionic liquid composition, it would have been obvious to one of skill in the art to provide a solvent free ionic liquid composition.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

There are two sets of claims numbered 25-33. For the purpose of completing this ISR, the first and second sets of claims 25-33 are renumberd as claims 25a-33a and 25b-33b respectively.

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Regarding claim 16, Rogers teaches the method according to Claim 1, wherein combining the cation precursor and anion precursor in step (b) is accomplished by an acid-base neutralization reaction (para [0400]), but does not specifically teach wherein the ratio of acid to base used for the neutralization reaction is not 1: 1. Since Rogers teaches acid-base neutralization reaction, it would have been obvious to one of skill in the art to identify appropriate acid to base ratio by routine experimentation.

Regarding claims 18-19 and 23, see the discussion set forth above as to claims 15-16.

Regarding claims 21-22, see the discussion set forth above as to claim 1. In addition, Rogers teaches the method according to Claim 1, wherein the ionic liquid is formed by the addition of an acid or a base to an ionic liquid (para [0094]; [0367]), but does not specifically teach the precursor are reacted in a solvent-free way via grinding or melting in a ratio that is not 1:1. Since Rogers teaches solvent involved ionic liquid composition, it would have been obvious to one of skill in the art to provide a solvent free ionic liquid composition achieved via grinding or melting procedure using appropriate acid to base ratio.

Regarding claim 24, Rogers teaches the method according to Claim 1, wherein the composition further comprises a solvent, preservative, dye, colorant, thickener, surfactant, a viscosity modifier, or a mixture thereof at less than about 10 wt. % of the total ionic liquid composition (claim 116).

Regarding claim 25a, Rogers teaches the composition according to Claim 1, wherein the at least one cation or at least one anion is the pharmaceutical active (para [0086]).

Regarding claim 26a, Rogers teaches the composition according to Claim 1, wherein the cation and the anion are both pharmaceutical actives (para [0086]).

Regarding claim 27a, Rogers teaches the composition according to Claim 1, wherein at least one cation is a pharmaceutical active and at least one anion is a taste modifier, or wherein at least one cation is a taste modifier and at least of anion is a pharmaceutical active (claim 49).

Regarding claim 28a, Rogers teaches the composition according to Claim 1, wherein at least one cation is an antibacterial and at least one anion is a taste modifier, or wherein at least one cation is a taste modifier and the at least one anion is an antibacterial (claim 50).

Regarding claim 29a, Rogers teaches the composition according to Claim 1, wherein at least one cation is an antibacterial and at least one anion is a pain reliever or anti-inflammatory, or wherein at least one cation is a pain reliever or anti-inflammatory and at least one anion is an antibacterial (claim 51).

Regarding claim 30a, Rogers teaches the composition according to Claim 1, wherein at least one cation is an antibacterial and at least one anion is a UV -blocker, or wherein at least one cation is a UV -blocker and the at least one anion is an antibacterial (claim 52).

Regarding claim 31a, Rogers teaches the composition according to Claim 1, wherein at least one cation is an anesthetic and at least one anion is an antibacterial, or wherein at least one cation is an antibacterial and the at least one anion is an anesthetic (claim 53).

Regarding claim 32a, Rogers teaches the composition according to Claim 1, wherein at least one cation is an anesthetic and at least one anion is a coagulator, or wherein at least one cation is a coagulator and at least one anion is an anesthetic (claim 54).

Regarding claim 33a, Rogers teaches the composition according to Claim 1, wherein at least one cation is an antibacterial and at least one anion is a coagulator, or wherein at least one cation is a coagulator and at least one anion is an antibacterial (claim 55).

Regarding claim 25b, Rogers teaches the composition according to Claim 1, wherein either the cation or anion or either the cation precursor or the anion precursor are chiral (para [0077]; [0147]-[0148])

Regarding claim 26b, Rogers teaches the method according to Claim 1, wherein both the cation and anion or both the cation precursor and anion precursor are chiral (para [0147]-[0148]).

Regarding claim 27b, Rogers teaches the composition according to Claim 1, wherein the chiral cation comprises ephedrine or a diastereomer thereof (para [0147]-[0148]).

Regarding claim 28b, Rogers teaches the composition according to Claim 1, wherein the chiral anion (para [0077]), but does not specifically teach camphorsulfonic acid. It would have been obvious to one of skill in the art to choose camphorsulfonic acid as anion by routine experimentation.

Regarding claim 29b, Rogers teaches the method according to Claim 1, wherein the cation or cation precursor is a pesticidal active or the anion or anion precursor is a pesticidal active (para [0086]).

Regarding claim 30b, Rogers teaches the method according to Claim 1, wherein the cation and anion or the cation precursor and anion precursor are both pesticidal actives (para [0086]).

Regarding claim 31b, Rogers teaches the method according to Claim 1, wherein the cation or cation precursor is a herbicidal active or the anion or anion precursor is a herbicidal active (para [0086]).

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Regarding claim 32b, Rogers teaches the method according to Claim 1, wherein the cation and anion or the cation precursor and anion precursor are both herbicidal actives (para [0086]).

Regarding claim 33b, Rogers teaches the method according to Claim 1, wherein the cation or cation precursor is a nutraceutical or the anion or anion precursor is a nutraceutical (para [0086]).

Regarding claim 34, Rogers teaches the method according to Claim 1, wherein the cation and anion or the cation precursor and anion precursor are both nutraceuticals (para [0086]).

Regarding claim 35, Rogers teaches the method according to Claim 1, wherein the cation or cation precursor is a food additive or the anion or anion precursor is a food additive (para [0086]).

Regarding claim 36, Rogers teaches the method according to Claim 1, wherein the cation and anion or the cation precursor and anion precursor are both food additives (para [0086]).

Regarding claim 37, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature at or below about 125 degree C (claim 23).

Regarding claim 38, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature at or below about 75 degree C (claim 24).

Regarding claim 39, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature at or below about 50 degree C (claim 25).

Regarding claim 40, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature at or below about 25 degree C (claim 26)

Regarding claim 41, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature at or below about 0 degree C(claim 27).

Regarding claim 42, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature at or below about -25 degree C (claim 27).

Regarding claim 43, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature at or below about -50 degree C (claim 27).

Regarding claim 44, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature from about -30 degree C to about 150 degree C (claim 27).

Regarding claim 45, Rogers teaches the method according to Claim 1, wherein the composition is liquid at a temperature from about 0 degree C to about 120 degree C (claim 23).

Regarding claim 46, Rogers teaches the method according to Claim 1, wherein the composition is liquid at about 37.C (claim 23).

Regarding claim 47, Rogers teaches the method according to Claim 1, wherein the composition is liquid over a temperature range of at least 4 degree C (claim 23).

Regarding claim 48, Rogers teaches the composition according to Claim 1, wherein the cation compromises a quaternary nitrogen or phosphor ion as cation (para [0105]).

Regarding claim 49, Rogers teaches the composition according to Claim 1, wherein the at least one kind of cation comprises an aliphatic heteroaryl cation, an aliphatic benzylalkyl ammonium cation, a dialiphatic dialkyl ammonium cation, or a tetraalkyl ammonium cation (para [0121]).

Regarding claim 50, Rogers teaches the composition according to Claim 1, wherein the cation compromises a protonated cation (para [0360]).

Regarding claim 51, Rogers teaches the composition according to Claim 1, wherein the cation comprises choline, lidocaine, tramadolium, caffeine, cetylpyridinium, ephedrinium or promethazine (claim 65).

Regarding claim 52, Rogers teaches the composition according to Claim 1, wherein the anion comprises salicylate, ibuprofenate, lactate, camphorsulfonate, trans-cinnamate, docusate, niacinate or Clofibrate (para [0382]).

Regarding claim 53, Rogers teaches the composition according to Claim 1, wherein the cation comprises tetrabutylphosphonium and the anion comprises salicylate and ibuprofenate, cinnamate, camphorsulfonate, lactate or thiosalicylate (para [0382]).

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Regarding claim 54, Rogers teaches the composition according to Claim 1, wherein the cation comprises tetrabutylphosphonium and the anion comprises ibuprofenate and niacinate (para [0338]).

Regarding claim 55, Rogers teaches the composition according to Claim 1, wherein the cation comprises cetylpyridinium and the anion comprise salicylate and ibuprofenate, cinnamate or clofibrate (para [0382]; [0338]).

Regarding claim 56, Rogers teaches the composition according to Claim 1, wherein the cation comprises lidocaine and the oligomeric anions comprises salicylate and ibuprofenate (para [0388]; claim 64).

Regarding claims 57-59, Rogers teaches the composition according to Claim 1, wherein the anion comprises salicylate (para [0382]), but does not specifically teach the cation as tramadolium or ephedrinium or lidocaine and anion as ibuprofenate. It would have been obvious to one of skill in the art to choose appropriate anionic and cationic moieties without undue experimentation.

Regarding claim 60, Rogers teaches the composition according to Claim 1, wherein the oligomeric cation comprises promethazine and ephedrine and the anions comprise docusate or salicylate (claim 97).

Claims 61-155 lack an inventive step under PCT Article 33 (3) as being obvious over Rogers in view of US 6,967,074 B2 to Duffy et al. (hereafter 'Duffy').

Regarding claims 61 and 117, Rogers teaches the method for the preparation of ionic liquid in pharmaceutical composition (para [0097]; abstract):
a) providing one or more cations and one or more anions (para [0086]); and
b) combining the cations and anions or the cation precursor and anion precursor, thereby producing an ionic liquid that is liquid at a temperature at or below 150C (claim 23, para [0096]-[0097]; [0100]), but does not specifically teach an active compound is immobilized in to ionic liquid or biologically active neutral compound is covalently attached to either the cation or the anion. However, Duffy teaches an active compound is immobilized in to a support or biologically active compound is covalently attached to the support (col 42, ln 41-64). It would have been obvious to one of skill in the art to combine the teachings of these references and immobilize the pharmaceutically active agent over the ionic liquid in order to provide an improved drug delivery system.

Regarding claim 62, Rogers teaches the method, wherein combining the cations and anions is accomplished by a metathesis reaction (para [0400]).

Regarding claim 63, Rogers teaches the method, wherein combining the cation precursor and anion precursor is accomplished by an acid-base neutralization reaction (para [0400]).

Regarding claim 64, Rogers teaches the method, wherein the cation precursor is a pharmaceutical active or the anion precursor is a pharmaceutical active (para [0086]).

Regarding claim 65, Rogers teaches the method, wherein the cation precursor and the anion precursor are both pharmaceutical actives (para [0086]).

Regarding claim 66, Rogers teaches the method, wherein either the cation precursor or the anion precursor, or the cation precursor and the anion precursor have bioactive properties (para [0097]) and the bioactive property comprises sensory, therapeutic, prophylactic, nutritional, pesticidal or herbicidal activity (claim 5).

Regarding claim 67, Rogers teaches the method, wherein either the cation precursor or the anion precursor, or the cation precursor and the anion precursor are food additives, flavors or fragrances (para [0086]).

Regarding claim 68, Rogers teaches the method, wherein the composition is liquid at a temperature at or below about 150C (claim 23).

Regarding claim 69, Rogers teaches the method, wherein the composition is liquid at a temperature at or below about 125C (claim 23).

Regarding claim 70, Rogers teaches the method, wherein the composition is liquid at a temperature at or below about 100C (claim 24).

Regarding claim 71, Rogers teaches the method, wherein the composition is liquid at a temperature at or below about 75C (claim 24).

Regarding claim 72, Rogers teaches the method, wherein the composition is liquid at a temperature at or below about 50C (claim 25).

Regarding claim 73, Rogers teaches the method, wherein the composition is liquid at a temperature at or below about 37C (claim 25).

Regarding claim 74, Rogers teaches the method, wherein the composition is liquid at a temperature at or below about 0C (claim 27).

Regarding claims 75 and 118, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches the cation selected from the group of ammonium, imidazolium, pyrrolidinium, pyridinium, phosphonium or sulfonium ion (para [0121]).

Regarding claims 76 and 119, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches an anion selected from the group of carboxylate, alkylphosphate, alkylsulfate, alkylsulfonate, alkylborate (para [0362]).

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Regarding claims 77 and 120, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches cation that is pharmaceutical or biological active (para [0086]).

Regarding claims 78 and 121, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches a cation that is used as nutraceutical, food additive (para [0086]).

Regarding claims 79 and 122, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches a cation that is used as fragrance or flavor (para [0086]).

Regarding claims 80 and 123, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches an anion that is pharmaceutical or biological active (para [0086]).

Regarding claims 81 and 124, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches an anion that is used as nutraceutical or food additive(para [0086]).

Regarding claims 82 and 125, see the discussion set forth above as to claims 61 and 117. In addition, Rogers an anion that is used as fragrance or flavor (para [0086]).

Regarding claims 83 and 126, see the discussion set forth above as to claims 61 and 117. In addition, Rogers an anion selected from the group of halide, phosphate, alkylphosphate, nitrate, sulfate, alkylsulfate, aryl sulfate, sulfonate, alkyl sulfonate, arylsulfonate, alkylborate, tosylate, saccharinate, alkyl carboxylate and alkoxycarboxylate (claim 61).

Regarding claims 84 and 127, see the discussion set forth above as to claims 61 and 117. In addition, Rogers Teaches a cation selected from the group of ammonium, imidazolium, pyrrolidinium, pyridinium, phosphonium or sulfonium ion (para [0121]).

Regarding claims 85 and 128, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches a biological or pharmaceutical active counter ion (para [0017]).

Regarding claims 86 and 129, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches the nutraceutical or food additive counterion (para [0086]).

Regarding claims 87 and 130, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches the biological active neutral compound is paired with a flavor or fragrance counterion (para [0086]).

Regarding claims 88 and 131, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches the compound can be selectively released under hydrolytic conditions (para [0408]).

Regarding claims 89 and 132, see the discussion set forth above as to claims 61 and 117. In addition, Rogers teaches compound can be selectively released depending on the pH value (para [0436]).

Regarding claims 90-95 and 133-138, see the discussion set forth above as to claims 61 and 117. Rogers does not specifically teach the biological active neutral compound can be selectively released at a specific pH values. However, Rogers does teach the drug delivery system is sensitive to pH (para [0436]). Therefore, it would have been obvious to one of skill in the art to optimize the pH of the system by routine experimentation.

Regarding claims 96-103 and 139-146, neither Rogers nor Duffy teaches the the biological active neutral compound can be selectively released under thermic conditions such a UV irradiation or electrodeposition or the specific temperature range. However, a skilled artisan would have been motivated to identify appropriate release temperature by routine experimentation.

Regarding claims 104 and 147, Rogers teaches the compound, wherein the compound is in the form of a salt and the biological active neutral compound can be selectively released at physiological conditions (para [0098]).

Regarding claims 105 and 151, see the discussion set forth above as to claims 61 and 117.

Regarding claims 106 and 148, Rogers teaches the compound, wherein the compound is in the form of a salt and the biological active neutral compound is an alcohol or phenol (claim 64).

Regarding claims 107, Rogers teaches the compound, wherein the compound is in the form of a salt and the biological active neutral compound comprises analgesics (para [0157]).

Regarding claims 108, Rogers teaches the compound, wherein the compound is in the form of a salt and the biological active neutral compound comprises acetaminophen (para [0157]).

Regarding claims 109, Rogers teaches the compound, wherein the compound is in the form of a salt and the biological active neutral compound comprises antitumor, antioxidant, antiarthritic, anti-amyloid, anti-ischemic or anti-inflammatory properties (para [0214]).

Regarding claims 110, see the discussion set forth above as to claims 61 and 117.

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Continuation of:
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Regarding claims 111, Rogers teaches the compound, wherein the compound is in the form of a salt and the biological active neutral compound is paired with docusate (para [0138]).

Regarding claims 112, Rogers teaches the compound, wherein the compound is in the form of a salt and the biological active neutral compound is transferred into a hemisuccinate anion (para [0149]).

Regarding claims 113 and 152-153, Rogers teaches the compound, wherein the compound is in the form of a salt and the hemisuccinate is paired with a cation selected from the group of ammonium, imidazolium, pyrrolidinium, pyridinium, phosphonium or sulfonium ion (para [0149]; [0369]).

Regarding claim 114, Rogers teaches the compound, wherein the compound is in the form of a salt and the hemisuccinate is paired with choline (claim 65).

Regarding claim 115, Rogers teaches the composition, wherein the composition further comprises a solvent, preservative, dye, colorant, thickener, surfactant, a viscosity modifier, or a
mixture thereof at less than about 10 wt. % of the total ionic liquid composition (claim 116).

Regarding claim 116, Rogers teaches the composition, wherein the composition further comprises a nonionic pharmaceutical active, nutraceutical, food additive, or mixture thereof. (para [0086]).

Regarding claims 149-150, neither Rogers nor teaches the compound, wherein the compound is terpene or menthol. However, it would have been obvious to one of skill in the art to provide the fragrance compound as terpene or menthol or any other fragrance compound that can neutralize bad odor.

Regarding claim 154, Rogers teaches the compound, wherein the compound is in the form of a salt and the hemisuccinate is paired with quaternary phosphonium or ammonium compounds present in detergents, phase transfer catalyst or any other laundry compounds (para [0105]; [0109]-[0110]).

Regarding claim 155, Rogers teaches the product comprising one or more compounds, wherein the product is a fine perfume, bodycare composition, toiletry, detergent perfume, fabric softener perfume, laundry detergent or a scent to mask industrial odors (para [0105]; [0109] -[0110]).

Claims 1-24, 25a-33a, 25b-33b and 34-155 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.