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(71) Applicant (for all designated States except US): **JRST, LLC** [US/US]; P. O. Box 307, Vandergrift, Pennsylvania 15690 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SZUHAY, John W.** [US/US]; P. O. Box 307, Vandergrift, Pennsylvania 15690 (US). **TROIANO, Richard** [US/US]; P. O. Box 307, Vandergrift, Pennsylvania 15690 (US).

(74) Agents: **WESTBY, Timothy S.** et al.; **CONLEY ROSE, P.C.**, P. O. Box 3267, Houston, Texas 77253-3267 (US).

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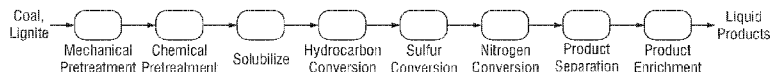


FIG. 1

(57) Abstract: A method for producing a liquid fuel from a hydrocarbon source. In one embodiment, the method comprises disintegrating a hydrocarbon source, treating the disintegrated hydrocarbon source, solubilizing the disintegrated hydrocarbon source, admixing a biochemical liquor, wherein the biochemical liquor comprises at least one conversion enzyme to form liquid hydrocarbons, separating liquid hydrocarbons, and enriching the liquid hydrocarbons to form a liquid hydrocarbon product. Further, the method comprises producing a liquid fuel in-situ. In certain embodiments the method comprises modified enzymes for producing the liquid fuels.



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A. CLASSIFICATION OF SUBJECT MATTER*C10L 1/32(2006.01)i, C12P 5/00(2006.01)i, C12P 7/00(2006.01)i, C10G 3/00(2006.01)i, C02F 11/02(2006.01)i*

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)

C10L 1/32; B02C 11/08; B02C 21/00; C10L 1/02; C12P 7/44

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: hydrocarbon, biochemical liquor, enzyme

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008-0305531 A1 (LAM DAVID et al.) 11 December 2008 See the abstract, Paragraph [13] ~ Paragraph [920], whole claims	28-33
A	See the abstract, Paragraph [13] ~ Paragraph [920], whole claims	1-27
A	US 4624417 A1 (GANGI; ALFRED J.) 25 November 1986 See the abstract, fig. 1, see page 2, line 20 - page14, line 42	1-33
A	US 2008-0190013 A1 (ARGYROPOULOS DIMITRIS) 14 August 2008 See the whole document	1-33

 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 application or patent 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 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

05 JULY 2010 (05.07.2010)

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Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

JO Soo Ik

Telephone No. 82-42-481-5893



Box No. 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.:
because they relate to subject matter not required to be searched by this Authority, namely:

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 No. 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:

- I. Claims 1-27 directed to a method of producing a liquid fuel comprising disintegrating hydrocarbon source, treating disintegrated hydrocarbon source, solubilizing, admixing a biochemical liquor comprising enzyme to form liquid hydrocarbon, separating, enriching the liquid hydrocarbon to form hydrocarbon product.
- II. Claim 28-33 directed to a method of using modified enzyme genetically to form a biochemical liquor and exposing a hydrocarbon to form a liquid fuel precursor.

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.:

- Remark on Protest**
- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/064801

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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