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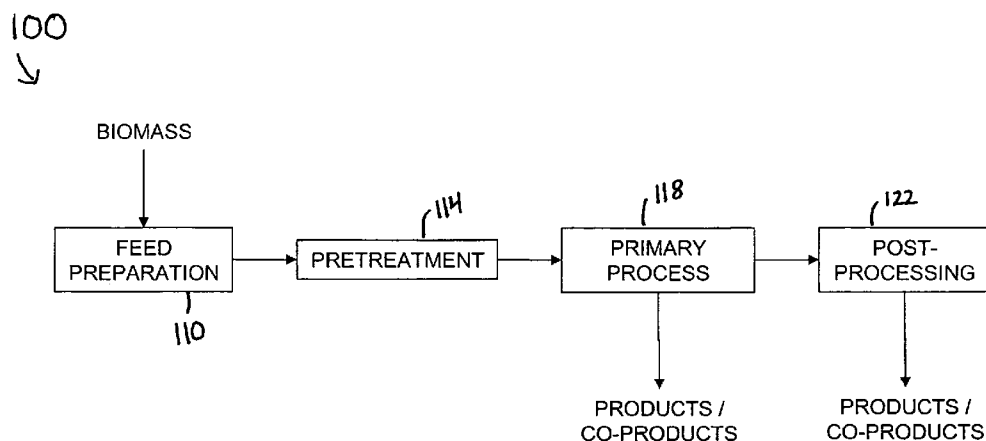
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(54) Title: PROCESSING BIOMASS



(57) Abstract: Biomass (e.g., plant biomass, animal biomass, and municipal waste biomass) is processed to produce useful products, such as fuels. For example, systems are described that can use feedstock materials, such as cellulosic and/or lignocellulosic materials, to produce ethanol and/or butanol, e.g., by fermentation.

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# INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/022719

## A. CLASSIFICATION OF SUBJECT MATTER

INV. C08H5/04 C10G1/00 C10L1/02 C10L5/44 C08L1/02  
C08L97/02 C08J3/28

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)

C08H C08L C10L C10G C12P C08J

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

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/186036 A1 (GOODELL BARRY S [US] ET AL) 2 October 2003 (2003-10-02) examples I,II	1-124
X	WO 00/31146 A (MONSANTO CO [US]) 2 June 2000 (2000-06-02) page 7, line 18 - page 8, line 29; claims 13,15,17,18	1-124
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☒ 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

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\*8\* document member of the same patent family

Date of the actual completion of the international search

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04/02/2009

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# INTERNATIONAL SEARCH REPORT

International application No

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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.
X	WO 2005/035148 A (DI GIOVANNI MAURIZIO [IT]) 21 April 2005 (2005-04-21) page 15, lines 1-14 page 21, lines 5-7 page 38, line 20 - page 46, line 7 claim 1 -----	1-124
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E	WO 2008/009644 A (BIOECON INTERNAT HOLDING N V [NL]; O'CONNOR PAUL [NL]; STAMIRE DENNIS) 24 January 2008 (2008-01-24) claims 1,10-13,18-26 -----	1-124
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X	US 2001/009955 A1 (HUTTERMANN ALOYS [DE] ET AL HUETTERMANN ALOYS [DE] ET AL) 26 July 2001 (2001-07-26) claim 1 -----	1-124
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X	DE 100 04 241 A1 (FALKHOF WERNER [DE]; SOHRE MICHAEL [DE]) 2 August 2001 (2001-08-02) claims 1,9,10 -----	1-124
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# INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/022719

## C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 526 607 A (ROESCH SUSAN M [US] ET AL) 18 June 1996 (1996-06-18) examples 4-6 -----	1-124
X	US 3 625 845 A (NAKAYAMA YUJIRO ET AL) 7 December 1971 (1971-12-07) claim 3; examples 5-9 -----	1-124
X	GB 1 251 542 A (MITSUBISHI YUKA KABUSHIKI KAISHA) 27 October 1971 (1971-10-27) claims 8-10 -----	1-124
X	DE 197 56 129 A1 (DTS SYSTEMOBERFLAECHEN GMBH [DE]) 8 July 1999 (1999-07-08) claim 1 -----	1-124
X	US 2005/200050 A1 (MEDOFF MARSHALL [US] ET AL) 15 September 2005 (2005-09-15) claims 42,54 -----	1-124

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2007/022719

### 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:

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 fees, this Authority did not invite payment of additional fees.
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.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-13

Method of changing the molecular structure of a biomass feedstock comprising pre-treating the biomass feedstock using two or more different pre-treatment methods selected from radiation, sonication, pyrolysis and oxidation

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2. claims: 14-74

Method of making a product comprising a pre-treatment and contact with a micro-organism

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3. claims: 75, 76, 78-87(part), 88, 89(part), 90(part), 91-94, 95-107(part)

Biomass feedstock processing system comprising two or more of the following pre-treatment modules: radiation, sonication, oxidation, pyrolysis.

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4. claims: 77, 78-87(part), 89(part), 90(part), 95-107(part)

System comprising a reaction vessel containing a pre-treated biomass material comprising a carbohydrate

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5. claims: 108-111

Carbohydrate material

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6. claims: 112-119

Composition

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7. claims: 120-122, 124(part)

Method for making a composite comprising an irradiating step

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8. claims: 123, 124(part)

Method of making an irradiated wood product

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/022719

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Information on patent family members

International application No

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