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(54) **Title:** BIOMASS CONVERSION PROCESS COMPRISING PRE-MIXING WITH COOL HEAT TRANSFER MEDIUM

(57) **Abstract:** A process is disclosed for pyrolysis of a particulate solid biomass material wherein the particulate solid biomass material is mixed with a cool particulate heat transfer material and the mixture fluidized prior to feeding the particulate solid biomass material/cool particulate heat transfer material mixture into the pyrolysis reactor. The particulate heat transfer material may have catalytic properties.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 10/31838

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - C07C 1/00 (2010.01) USPC - 585/324; 585/310 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) USPC - 585/324; 585/310 IPC(8) - C07C 1/00 (2010.01)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC - 585/324; 585/310 (keyword delimited) IPC(8) - C07C 1/00 (2010.01)		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWEST (USPT,PGPB,EPAB,JPAB); Google; Lexis/Nexis Search terms Used: pyrolysis temperature catalyst cool particle mix combine prior before medium media biomass bed reactor gasification heat transfer		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,814,940 B1 (Hiltunen et al.) 09 November 2004 (09.11.2004), col 3, ln 33-37; col 2, ln 45-46; col 6, ln 44-55; col 4, ln 44-45	1-4
Y	Onay et al., "Comparison of the generation of oil by the extraction and the hydrolysis of biomass." Fuel 85 (2006) 382-392, available online 02 August 2005 (02.08.2005), entire document, especially pg 383, section 2.4	1-4
A	US 4,311,670 A (Nieminen et al.) 19 January 1982 (19.01.1982), entire document, especially col 3, ln 39-65	1-4
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>		
* 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 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 01 June 2010 (01.06.2010)		Date of mailing of the international search report 18 JUN 2010
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 10/31838

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.: 5-16
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:

- 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 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.