

1) Family number: 3245934 (US4475924A)

© PatBase

Title:	Coal derived fuel composition and method of manufacture			
Priority:	US19810247382 19810324	WO1982US00321 19820317	CA19820398745 19820318	
	EP19820301473 19820322	US19820427937 19820929	US19840651947 19840919	
	US19840651950 19840919	US19840658878 19841009	US19840658880 19841009	
	US19850722689 19850412	US19850355528 19850523	US19870059288 19870608	
	US19870059289 19870608	US19870084270 19870811	US19880277603 19881129	
	US19890355528 19890523	CA19892003795 19891124	WO1989US05329 19891127	
	US19900498516 19900326	US19900522933 19900514	US19900528303 19900525	
	US19900547559 19900703	US19910709747 19910604		
Family:	Publication number	Publication date	Application number	Application date
	AT20905 E	19860815	AT19820301473T	19820322
	AU198283921 A1	19821019	AU19820083921	19820317
	AU199048124 A1	19900626	AU19900048124	19891127
	AU549579 B2	19860130	AU19820083921	19820317
	AU636324 B2	19930429	AU19900048124	19891127
	CA1172851 A1	19840821	CA19820398745	19820318
	CA2003795 AA	19900529	CA19892003795	19891124
	DE3272077 D1	19860828	DE19823272077	19820322
	EP0061339 A2	19820929	EP19820301473	19820322
	EP0061339 A3	19830921	EP19820301473	19820322
	EP0061339 B1	19860723	EP19820301473	19820322
	EP0485378 A1	19920520	EP19900901279	19891127
	EP0485378 A4	19910819	EP19900901279	19891127
	JP4502340 T2	19920423	JP19900501553T	19891127
	KR0133297 B1	19980414	KR19900071654	19900728
	KR19907001971 A	19901205	KR19907001654	19891127
	US4475924 A	19841009	US19820427937	19820929
	US4671800 A	19870609	US19840658878	19841009
	US4685936 A	19870811	US19840658880	19841009
	US4702747 A	19871027	US19840651947	19840919
	US4704134 A	19871103	US19840651950	19840919
	US4787915 A	19881129	US19870084270	19870811
	US4832831 A	19890523	US19870059288	19870608
	US4842615 A	19890627	US19870059289	19870608
	US4938782 A	19900703	US19880277603	19881129
	US4971683 A	19901120	US19900498516	19900326
	US5021148 A	19910604	US19890355528	19890523
	US5110452 A	19920505	US19900522933	19900514
	US5132007 A	19920721	US19900528303	19900525
	US5198103 A	19930330	US19900547559	19900703
	US5240592 A	19930831	US19910709747	19910604
	WO8203405 A1	19821014	WO1982US00321	19820317
	WO9006352 A1	19900614	WO1989US05329	19891127
	ZA8909111 A	19910731	ZA19890009111	19891129
Probable Assignee:	TENNESSEE VALLEY AUTHORITY			
Assignee(s):(std):	MEYER E G ; MEYER EDMOND G ; CARBON FUELS CORP ; MEYER EDMOND GERALD ; CARBON FUEL CORP ; MEYER TRUST			
Assignee(s):	SUDDUTH BRUCE C ; CARBON FUELS A CORP OF WY CORP ; ADVANCED COAL TECHNOLOGIES INC ; CAVALIERE GERALD F ; MEYER LEE G ; TENNESSEE VALLEY AUTHORITY PO BOX ; TENNESSEE VALLEY AUTHORITY ; CARBON FUELS A WYOMING CORP CORP			
Inventor(s):(std):	BRUCE C SUDDUTH ; GERALD F CAVALIERE ; LEE G MEYER ; MEYER E G ; MEYER EDMOND GERALD ; SUDDUTH BRUCE C ; MEYER LEE G ; CAVALIERE GERALD F ; CAVALIERE FERALD F ; MEYER EDMOND G			
Inventor(s):	MEYER EG			
Agent(s):	DAVIES COLLISON CAVE; DAVIES COLLISON CAVE PTY LTD; FREEHILLS PATENT AND TRADE MARK ATTORNEYS; FREEHILLS PATENT ATTORNEYS; FPA PATENT ATTORNEYS PTY LTD; MEREDITH AND FINLAYSON; GOWLING LAFLEUR HENDERSON LLP			
Designated states:	AT AU BE BR CH DE ES FR GB IT JP KR LI LU NL SE			
International class (IPC 8-9):	C01B3/24 C01G1/02 C07C15/04 C07C4/12 C10G1/00 C10G1/02 C10G1/06 C10G2/00 C10L1/32 (Advanced/Invention); C10G2/00 (Advanced/Non-invention); C07C15/00 C07C4/00 C10G1/00 C10G2/00 C10L1/32 (Core/Invention); C10L (Subclass/Invention)			
International class (IPC 1-7):	C01B3/24 C01G1/02 C07C15/04 C07C4/12 C10G1/00 C10G1/02 C10G1/06 C10G2/00 C10L1/32			
CPC:	C10L1/322 C10G1/02 C10K1/003 C10L1/32 C10G1/002 C10J2300/0903 C10J2300/093 C10J2300/094 C10J2300/0959 C10J2300/0973 C10J2300/165 C10J2300/1665 C10J2300/1671 C10J2300/1675 C10J2300/1823 Y02P20/129			
European class:	C10G1/00B C10G1/02 C10K1/00D2 C10L1/32 C10L1/32A M10J300/09B M10J300/09D6 M10J300/09D8 M10J300/09F14 M10J300/09F4 M10J300/16F2D M10J300/16F4F M10J300/16K M10J300/16K2 M10J300/18B4			
US class:	208/400 208/403 208/415 208/423 208/427 208/431 208/433 406/47 44/15R 44/1R 44/1SR 44/280 44/281 44/282 44/47 44/505 44/51 44/512 44/607 44/620			

Cited documents:

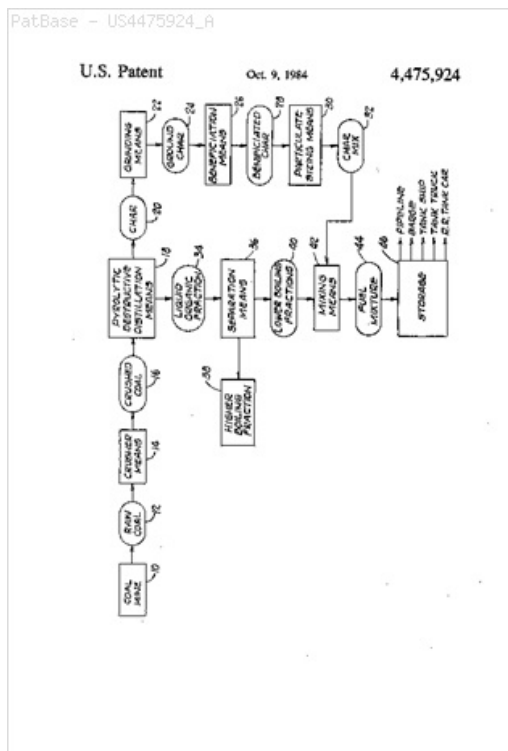
US5021148 A, US4938782 A, US4842719 A, US4842615 A, US4832831 A, US4787915 A, US4687570 A, US4685936 A, US4671800 A, US4597776 A, US4594140 A, US4551224 A, US4536278 A, US4536277 A, US4491456 A, US4490156 A, US4475924 A, US4460378 A, US4450066 A, US4443230 A, US4415431 A, US4357228 A, US4356077 A, US4351645 A, US4278446 A, US4278445 A, US4249911 A, US4208251 A, US4192651 A, US4123347 A, US4113445 A, US4048054 A, US4030893 A, US4014661 A, US3960700 A, US3957619 A, US3844733 A, GB292217 A, EP0046693 A1,

Forward Citations:

WO9514850, WO9117230, WO9006352, WO12145497, WO11018198, WO10066048, WO09086407, WO09086407, WO09086370, WO09086370, WO08067221, WO06042308, WO04113474, WO04113474, WO04099348, WO04099348, WO04015028, WO0245839, USRE45869, US9951689, US9926492, US9920923, US9869245, US9850815, US9850439, US9828552, US9726375, US9605890, US9598646, US9581082, US9562473, US9523312, US9523039, US9512999, US9505999, US9493709, US9446975, US9353325, US9353322, US9352270, US9328920, US9327320, US9279091, US9278314, US9273260, US9234149, US9231267, US9228132, US9163192, US9127221, US9097152, US9096804, US9090843, US9085738, US9074138, US9062608, US9045693, US9034061, US9034058, US9012524, US9005322, US8999020, US8980802, US8968520, US8959887, US8940265, US8932375, US8920770, US8906336, US8882862, US8877995, US8869889, US8814983, US8808529, US8776532, US8748687, US8734548, US8734547, US8734544, US8733459, US8728183, US8728182, US8709113, US8690977, US8669013, US8653149, US8652696, US8652222, US8651282, US8648121, US8647402, US8636922, US8597503, US8597382, US8596075, US8591727, US8579999, US8557878, US8545580, US8523963, US8512551, US8502007, US8480771, US8479834, US8479833, US8470134, US8465561, US8449632, US8444828, US8431043, US8409303, US8408396, US8407911, US8402762, US8394240, US8377154, US8366882, US8366795, US8361428, US8349039, US8328890, US8313556, US8297542, US8286901, US8268899, US8252070, US8226816, US8202913, US8197678, US8192716, US8178145, US8163048, US8156662, US8123827, US8114177, US8114176, US8110169, US8062410, US8057578, US8048528, US8048202, US8025705, US7987613, US7975398, US7966741, US7935245, US7932204, US7926750, US7922782, US7921631, US7909895, US7901644, US7897132, US7897126, US7892324, US7882646, US7871577, US7866060, US7856992, US7811446, US7803201, US7770640, US7767075, US7758660, US7699975, US7699974, US7694523, US7685737, US7665291, US7628827, US7617617, US7610692, US7588608, US7569136, US7544346, US7479217, US7455817, US7357903, US7341102, US7291257, US7279017, US7264711, US7226490, US7135154, US7135154, US7008460, US6898936, US6881326, US6749652, US6726849, US6719956, US6656239, US6656238, US6596781, US6488722, US6266894, US6123835, US6083286, US6056793, US5928495, US5846404, US5779861, US5690482, US5607486, US5527427, US5485728, US5416245, US5342702, US5296005, US5269909, US5240592, US5234475, US5200063, US5198103, US5132007, US5110452, US5021148, US4971683, US4938782, US4861346, US4859209, US4842615, US4832831, US4808194, US4787915, US4742784, US4685936, US4671800, US4605420, US2018216497, US2016363080, US2016017798, US2014283453, US2013152453, US2012308441, US2012227315, US2012016574, US2011232545, US2011210292, US2011200897, US2011192074, US2011168541, US2011155652, US2011146278, US2011099887, US2011091953, US2011081586, US2011070510, US2011061298, US2011061295, US2011041784, US2011011722, US2011011720, US2011011719, US2011005126, US2010292350, US2010179232, US2010175320, US2010151293, US2010145115, US2010104555, US2010038288, US2010037729, US2010001429, US2009324488, US2009255173, US2009217582, US2009188127, US2009183424, US2009169449, US2009169448, US2009165383, US2009158701, US2009152209, US2009152208, US2009095155, US2009090055, US2009025294, US2008256852, US2008220698, US2008202985, US2008149471, US2008103220, US2008098654, US2008072476, US2008028634, US2008017549, US2007277529, US2007277437, US2007272538, US2007187292, US2007187291, US2007186475, US2007180760, US2007163142, US2007083072, US2007062103, US2006254141, US2006228282, US2006222854, US2006175230, US2006174902, US2006127305, US2006096163, US2006075682, US2006074132, US2005223632, US2005204615, US2005082202, US2004244282, US2004222131, US2004200759, US2004197259, US2004195545, US2004177549, US2004125824, US2003156195, US2003080029, US2002098129, US2002094310, US2002091166, US2002090334, US2002090326, US2002083646, US10174639, US10103737, US10094616, US10076129, US10072598, US10047673, US10047671, US10018115, ITMI20112011, GB2420788, GB2420788, EP2589646, EP2589646, EA021013, DE3340971, CN106701224, CN106701224, CN106635206, CN106635206, CN103275777, CN103275777, CN102549116, CN102549116, CN102344839, CN102131587, CN102131587, CN101910375, AU636324, AU2005295110, AU2005295110,

Abstract:

Coal char produced by the pyrolytic destructive thermal distillation of coal in the absence of oxygen is beneficiated, ground and sized and then is admixed in suitable portions with a liquid organic fraction to form a combustible, liquid-solid mixture which is a nonpolluting, stable, transportable, high energy fuel composition. Preferably, the liquid organic fraction is obtained from the low boiling fractions derived from the pyrolysis of coal.



Title: DISTILLATION REACTOR MODULE

Priority: US20130800209P 20130315 US20130801170P 20130315 US20130801491P 20130315
US20140776734 20140318 US20140776736 20140318 WO2014US31118 20140318
WO2014US31116 20140318 US20140776732 20140515 WO2014US38290 20140515

Family:	Publication number	Publication date	Application number	Application date
	CA2907677 AA	20150921	CA20142907677	20140318
	EP2969180 A2	20160120	EP20140762668	20140318
	EP2969180 A4	20161005	EP20140762668	20140318
	IL242590 A0	20160131	IL20140242590	20140318
	JP2016512165 T2	20160425	JP20160502609T	20140318
	US2016030856 AA	20160204	US20140776734	20140318
	US2016032904 AA	20160204	US20140776736	20140318
	US2016045841 AA	20160218	US20140776732	20140515
	WO14146129 A2	20140918	WO2014US31118	20140318
	WO14146129 A3	20150129	WO2014US31118	20140318
	WO14153570 A2	20140925	WO2014US38290	20140515
	WO14153570 A3	20150219	WO2014US38290	20140515
	WO14153570 A9	20150806	WO2014US38290	20140515
	WO14200605 A2	20141218	WO2014US31116	20140318
	WO14200605 A3	20150326	WO2014US31116	20140318
	WO14200605 A4	20150430	WO2014US31116	20140318
	WO14200605 A9	20150205	WO2014US31116	20140318

Probable Assignee: TRANSTAR GROUP LLC

Assignee(s):(std): BRADLEY RANDALL ; KALPAN ALLEN ; KAPLAN ALLEN ; TRANSTAR GROUP LTD

Assignee(s): TRANSTAR GROUP LLC

Inventor(s):(std): KALPAN ALLEN ; KAPLAN ALLEN ; BRADLEY RANDALL

Agent(s): ADE AND CO INC; NELLIGAN OBRIEN PAYNE LLP; PERRONACE ANDREA; HERSHKOVITZ ABRAHAM ET AL; HERSHKOTIZ ABRAHAM ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B01D3/00 B01D3/06 B01D3/10 B01D3/26 B01D3/32 B01D39/20 B01D53/48 B01D53/62 B01D59/04 B01J B01J19/24 B01J19/26 B01J2/00 B01J6/00 B01J8/24 B02C23/00 B03C1/00 B22F3/10 B22F9/00 B29B17/00 C01B17/027 C01B17/74 C02F1/00 C10B49/12 C10G1/00 C10G11/18 C10G33/00 C10G45/00 C10G57/00 C10G7/00 C10G7/06 C10G9/04 C10J3/72 C10L9/10 C22B13/00 C22B15/00 C22B21/00 C22B7/00 C22B9/00 F03G7/00 F27B17/00 G21C1/02 G21D5/00 H01M10/54 H01M8/00 H02K55/02 H02K7/09 (Advanced/Invention)

CPC: Y02E30/40 G21D1/00 B01J19/0093 B01J2219/00864 B01J2219/00867 B01J2219/00871 C01G21/02 C01B3/32 C01B13/02 C01B17/02 C01B2203/0205 C01B2203/0283 C01B2203/043 C01B2203/0445 C01B2203/0475 C10G1/02 C10G1/10 C10G31/08 C10G75/04 Y02P20/129 B09B5/00 Y02P30/446 Y02E30/30 B01D3/10 B01D3/006 B01D3/06 B01D39/2027 F03G7/00 B01D3/009 C10G7/06 G21C1/00 G21D5/00 C10G7/00 C10G57/00 C10G7/003 C10L9/10 C10J3/72 C10G1/00 C01B17/027 C01B17/74 B01J6/008 B01J2/00 B01J19/24 B01D53/48 B01D53/62 C22B9/00 F27B17/00 C02F1/00 C22B7/00 B29B17/00 B22F3/10 B22F9/00 C22B21/00 C22B15/00 C22B13/00 H01M8/00 H01M10/54 H02K55/02 H02K7/09 B02C23/00 B03C1/00 C10L2290/544 C10J2300/093 C10J2300/0946 B22F2009/001 C01B17/48 C10G11/18 C10G33/00 C10G45/00 Y02E20/16 Y02E20/18 Y02W10/33 Y02W10/37 Y02W30/84 C01B32/05 C01B32/20 C01B32/50 Y02P10/143

US class: 196/46 202/232 209/213 210/251 241/301 241/65 266/160 310/90.5 422/129 422/170 422/187 422/198 422/255 423/522 423/567.1 429/49 505/163 505/166 60/698

[Classification Explorer](#)

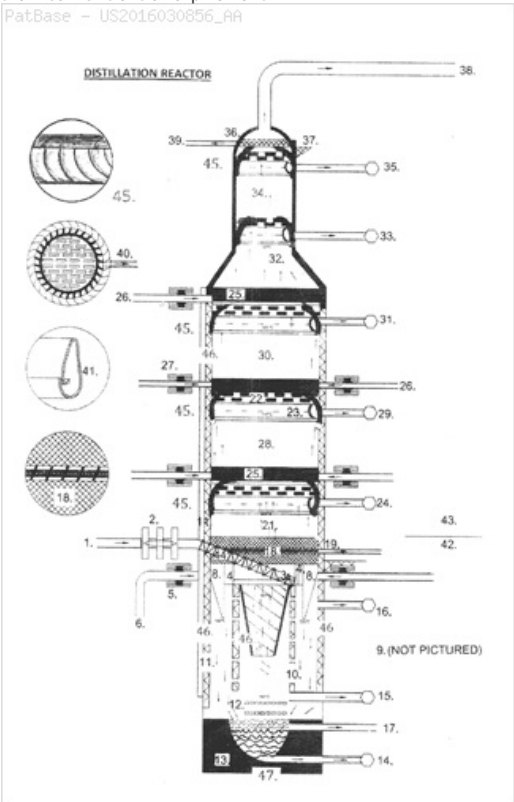
Cited documents: WO12100247 A2, WO12085880 A2, WO10077141 A1, WO0003807 A1, US7452515 BA, US7220365 BB, US6325840 BA, US6193194 BA, US5251976 A, US5247548 A, US5139764 A, US5020411 A, US4904347 A, US4018567 A, US3931503 A, US3870507 A, US3850620 A, US3836339 A, US3168807 A, US3052535 A, US2013256113 AA, US2013055699 AA, US2012220509 AA, US2012027156 AA, US2011308158 AA, US2011168541 AA, US2010192980 AA, US2009120842 AA, US2009011291 AA, US2008093302 AA, US2007044659 AA, US2006211899 AA, US2006002829 AA, US2005167333 AA, JP2012229959 A2, EP2510994 A1, EP1249485 A1, CN101376068 A,

Forward Citations: WO18231047, WO18125471, WO18097757, WO18097756, WO18049153, WO18035152, WO18013599, WO17212342, WO17210046, WO17195173, WO17044178, WO17034980, WO16094264, WO16057636, WO15200478, WO15143574, US9964962, US9915477, US9909496, US9901932, US9891004, US9879918, US9869209, US9859477, US9851153, US9845996, US9845995, US9843062, US9840413, US9828885, US9816759, US9816755, US9816401, US9803930, US9803513, US9803511, US9803509, US9803508, US9803507, US9803506, US9803505, US9803145, US9796852, US9790574, US9757667, US9751778, US9745871, US9745867, US9725652, US9719933, US9658044, US9640370, US9636633, US9614743, US9598653, US9588229, US9561463, US9505999, US9487908, US9458597, US9410414, US2017341015, US2017333581, US2017274387, US2017209829, US2017207372, US2017175564, US2017075362, US2017066663, US2017058723, US2017058721, US2017058703, US2017030264, US2017002731, US2016339535, US2016333831, US2016333286, US2016326040, US2016320056, US2016313058, US2016284445, US2016258730, US2016102260, US2016057039, US2015353388, US2015107822, US2015104357, US2015008156, US2014277754, US2014174658, US2013335079, US2012133464, US10233833, US10233787, US10227899, US10221775, US10174640, US10170960, US10156517, US10138378, US10126067, US10125640, US10125639, US10124695, US10119764, US10118124, US10113805, US10113448, US10100200, US10094219, US10093873, US10082104, US10082045, US10058873, US10016719, US10012448, RU2676675, RU2655161, RU2632837, RU2632293, KR101759327, GB2542051, CN107718877, CN107207976, CN105523598,

Abstract:

The distillation reactor consists of a reactor apparatus with corresponding method of upstream distilling and purification of carbon based liquid or liquidized streams for use as fuels, lubricating oils and or gaseous energy and electricity production. The distillation reactor consolidates the atmospheric and vacuum distillation processes along with desalting, defueling, deasphalting,

fractionation, thin/wiped film evaporation and Hydro finishing into an advanced high velocity, high volume single reactor system. Carbon based feed streams include either a single stream or preferably, a combined stream of liquefied coal slurries, crude oils, spent oils, Pyrolyic oils and or peat or other plant carbon derived liquids, vapors, mists or gases. The method further consists of controlling the mix ratio, flow velocity, sequential fractionation and filtration technology and processing atmospheres of the carbon feeds with the reactor apparatus. The combined apparatus and method allows for a refinery to consistently produce a finished barrel of oil well below traditional costs and at a higher efficiency than current art and prior art.

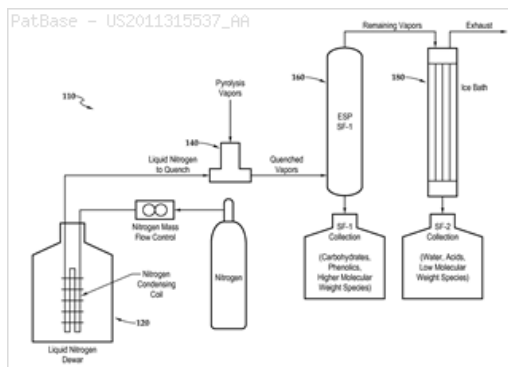


3) Family number: 50258756 (US2011315537A)

© PatBase

Title:	SELECTIVE TEMPERATURE QUENCH AND ELECTROSTATIC RECOVERY OF BIO-OIL FRACTIONS																			
Priority:	US20100358351P 20100624		US20110114846 20110524																	
Family:	<table><tr><th>Publication number</th><th>Publication date</th><th>Application number</th><th>Application date</th></tr><tr><td>US2011315537 AA</td><td>20111229</td><td>US20110114846</td><td>20110524</td></tr><tr><td>US8992736 BB</td><td>20150331</td><td>US20110114846</td><td>20110524</td></tr><tr><td>WO11162902 A1</td><td>20111229</td><td>WO2011US37765</td><td>20110524</td></tr></table>				Publication number	Publication date	Application number	Application date	US2011315537 AA	20111229	US20110114846	20110524	US8992736 BB	20150331	US20110114846	20110524	WO11162902 A1	20111229	WO2011US37765	20110524
Publication number	Publication date	Application number	Application date																	
US2011315537 AA	20111229	US20110114846	20110524																	
US8992736 BB	20150331	US20110114846	20110524																	
WO11162902 A1	20111229	WO2011US37765	20110524																	
Probable Assignee:	CONOCO PHILLIPS CO																			
Assignee(s):(std):	CONOCOPHILLIPS CO IP SERVICES GROUP ; CONOCOPHILLIPS COMPANY IP SERVICES GROUP ; JONES SAMUEL T ; DAUGAARD DAREN ; UNIV IOWA RES FOUND ; DALLUGE DUSTIN L ; PHILLIPS 66 CO ; DAUGAARD DAREN E ; UNIV IOWA STATE RES FOUND INC ; BROWN ROBERT C																			
Assignee(s):	CONOCO PHILLIPS CO ; CONOCOPHILLIPS CO ; IOWA STATE UNIV RESEARCH FOUNDATION INC ; IOWA STATE UNIVERSITY RESEARCH FOUNDATION INC																			
Inventor(s):(std):	BROWN ROBERT C ; DALLUGE DUSTIN L ; DAUGAARD DAREN ; DAUGAARD DAREN E ; JONES SAMUEL T																			
Agent(s):	TERESA J; CHRIS P; GARDERE WYNNE SEWELL LLP; VALOIR TAMSEN ET AL																			
Designated states:	AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW																			
International class (IPC 8-9):	B01D5/00 B03C3/014 B03C3/017 C10B45/00 C10B49/00 C10B49/08 C10B53/02 C10C5/00 C10G1/00 C10G9/00 C10K1/02 C10K1/04 (Advanced/Invention); B01D53/00 (Advanced/Non-invention)																			
CPC:	C10C5/00 B01D5/0027 B01D53/002 B01D2257/708 B03C3/014 B03C3/017 C10B49/08 C10B53/02 C10K1/028 C10K1/04 Y02E50/14 Y02P20/145																			
European class:	B01D5/00D B03C3/014 B03C3/017 C10B49/08 C10B53/02 C10C5/00 C10K1/04 L01D257/708 L01D53/00C																			
US class:	201/19 201/19P 201/30 585/240 585/242 95/67 95/73																			
Classification Explorer																				
Cited documents:	WO11041756 A2, US8476480 BA, US6567157 BA, US5150576 A, US4696679 A, US4424680 A, US4375402 A, US2011245489 AA, US2007129559 AA, US2005039599 AA, US1604424 A, US1204906 A,																			
Forward Citations:	WO18042345, US9410096, US2016222299, US2014305044, US2014221688, US10196571, US10144875, CN103789076,																			

Abstract:
A process for quenching, separating and collecting targeted components of a hot pyrolysis product stream from the pyrolysis of biomass is provided. The process utilizes rapid quenching and electrostatic precipitation at a predetermined temperature in order to selectively collect one or more fractions of the hot mixture.



4) Family number: 40796714 (US2009308787A)

© PatBase

Title: PROCESS FOR CONVERTING CARBON-BASED ENERGY CARRIER MATERIAL

Priority: EP20060113545 20060505 EP20060113567 20060505 US20060831220P 20060717
 EP20070102737 20070220 EP20070728828 20070504 WO2007EP54375 20070504
 US20070299319 20070504 EP20080709128 20080220 WO2008EP52050 20080220
 US20080299319 20081103 US20110008430 20110118 US20130892728 20130513

Family:	Publication number	Publication date	Application number	Application date
	BRPI0711564 A2	20111108	BR2007PI11564	20070504
	BRPI0807539 A2	20140610	BR2008PI07539	20080220
	CA2651463 AA	20081105	CA20072651463	20070504
	CA2651463 C	20141202	CA20072651463	20070504
	CA2679348 AA	20090820	CA20082679348	20080220
	CN101460593 A	20090617	CN200780020324	20070504
	CN101460593 B	20130213	CN200780020324	20070504
	DK2032675 T3	20180416	DK20070728828T	20070504
	EP1852490 A1	20071107	EP20060113545	20060505
	EP1852491 A1	20071107	EP20060113567	20060505
	EP1970425 A1	20080917	EP20070102737	20070220
	EP2032675 A1	20090311	EP20070728828	20070504
	EP2032675 B1	20180228	EP20070728828	20070504
	EP2115097 A1	20091111	EP20080709128	20080220
	IN06659CN2008 A	20090327	IN2008CN06659	20081204
	JP2009536235 T2	20091008	JP20090508362T	20070504
	KR20090013818 A	20090205	KR20087029679	20081204
	MX2008014179 A1	20090204	MX20080014179	20070504
	RU2008147909 A	20100610	RU20080147909	20070504
	RU2437917 C2	20111227	RU20080147909	20070504
	US2009308787 AA	20091217	US20070299319	20070504
	US2010187162 A	20100729	US20080527894	20080220
	US2011197511 AA	20110818	US20110008430	20110118
	US2013245346 AA	20130919	US20130892728	20130513
	US7901568 BB	20110308	US20070299319	20070504
	US8460541 BB	20130611	US20110008430	20110118
	US8709239 BB	20140429	US20130892728	20130513
	WO07128798 A1	20071115	WO2007EP54375	20070504
	WO08101949 A1	20080828	WO2008EP52050	20080220

Probable Assignee: INAERIS TECHNOLOGIES LLC

Assignee(s):(std): BIOECON INT HOLDING BV ; BIOECON INTERNAT HOLDING B V ; INAERIS TECH LLC ; STAMIREN DENNIS ; O CONNOR PAUL ; MOULIJN JACOB ADRIAAN ; KIOR INC ; BIOECON INT HOLDING NV ; KAJOR INK

Assignee(s): BIOECON INT HOLDING NVKAYA W.F.G.JOMBIMENSING 14CURACAOAN ; INAERIS TECHNOLOGIES LLC ; KHOSLA VENTURES III LP ; KFT TRUST C O KHOSLA VENTURES ; KFT TRUST VINOD KHOSLA TRUSTEE FIRST LIEN AGENT AS ; KIOR INCE - 15 HOGEBRINKERWEG3871 KMHOEVELAKENNL ; KIOR LLC ; BIOECON INTERNAT HOLDING N V ; 1538731 ALBERTA LTD AGENT AS ; BIOECON BV ; BIOECON BVE - 15 HOGEBRINKERWEG3871 KMHOEVELAKENNL ; BIOECON INT HOLDING N V ; BIOECON INTERNATIONAL HOLDING N V ; BIOECON INTERNATIONAL HOLDING B V

Inventor(s):(std): ADRIAAN MOULIJN JACOB ; DENNIS STAMIREN ; MONLIJN JACOB ADRAAN ; MOULEJN JAKOB ADRIAN ; MOULIJN JACOB ADRIAAN ; O CONNOR PAUL ; O KONNOR POL ; STAMIREN DENNIS ; STEHMAJRS DENNIS

Inventor(s): STAMIREN DENNISUS ; O'CONNOR PAUL ; O'KONNOR POL ; PAUL O CONNOR ; O CONNOR PAULNL ; MOULIJN JACOB ADRIAANNL ; MOULIJN JACOB ; JACOB ADRIAAN MOULIJN

Agent(s): BERESKIN AND PARR LLP; BERESKIN AND PARR LLP SENCRL SRL; RASSER JACOBUS CORNELIS ET AL; DERKS WILBERT ET AL; KELLER GUENTER; CLARKSON PAUL MAGNUS; KIOR INC; HOWREY LLP-EU; JENNIFER A; NATALIE; GREENBERG TRAURIG LLP

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

International class (IPC 8-9): B01J21/10 B01J21/16 B01J23/00 B01J27/232 B09B3/00 C08J11/16 C10B49/20 C10B53/02 C10B57/08 C10C3/02 C10G1/00 C10G1/04 C10G1/06 C10G1/08 C10G1/10 C10G11/00 C10G11/18 C10G35/04 C10J3/46 C10J3/54 C10L3/00 (Advanced/Invention); B01J21/16 B01J23/00 C10B49/20 C10G1/08 (Advanced/Non-invention); B01J21/00 B01J23/00 B01J27/20 B09B3/00 C08J11/00 C10B49/00 C10B53/00 C10B57/00 C10C3/00

C10G1/00 C10G11/00 C10G35/00 C10J3/46 (Core/Invention)

International class
(IPC 1-7):

C10G1/00

CPC:

C10B53/02 C10G1/02 C10B57/08 C10G1/086 C10G11/18 Y02E50/14 C10B49/20 C10G1/08

European class:

C10B49/20 C10B53/02 C10B57/08 C10G1/02 C10G1/08 C10G11/18 Y02E20/18 Y02E50/14

US class:

208/125 208/126 208/134 208/134S 208/400 208/407 208/408 208/409 208/410 208/411 208/435
208/44 208/44P 44/307 44/605 44/606 44/620 48/197FM 585/240 585/241 585/242 585/469 585/638

[Classification Explorer](#)

Cited documents:

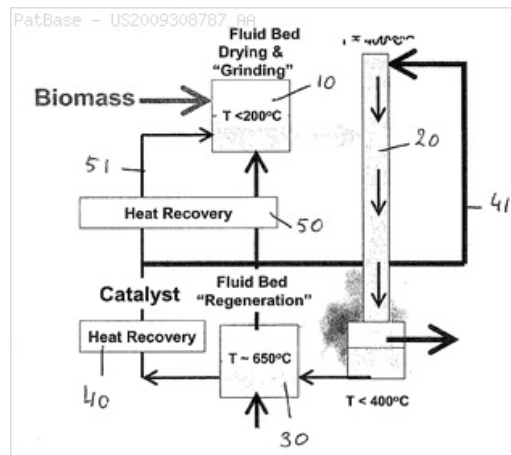
WO07128798 A1, WO0214040 A1, WO0214040 A1, WO0134725 A1, WO0134725, US7901568 BB, US6893492 BB, US6743746 BA, US6193915 BA, US5792340 A, US5160636 A, US4876108 A, US3516977 A, US2011154720 AA, US2008053870 AA, US2005064577 AA, US2002072640 AA, GB208725 A, GB2003919 A1, FR2478666 A1, EP1970425 A1, EP1852492 A1, EP1852490 A1, EP0419265 A1, DE3734155 A1, CA1163595 A1, CA1163595 A1, CA1123774 A1, CA1123774 A1,

Forward Citations:

WO15179798, WO15095498, WO14175941, WO14025479, WO13019328, WO13019328, WO12128840, WO12128840, WO12128055, WO12084000, WO12083999, WO12083998, WO12082374, WO12082374, WO12082373, WO12082367, WO12012191, WO11123508, WO11062410, WO11062410, WO11005400, WO10025326, WO10025326, WO10002792, WO10002792, WO09138757, WO09138757, WO09118363, WO09118363, WO09000838, WO09000838, WO08101949, WO08081410, WO08081410, WO08081409, WO08081409, WO08081408, WO08081408, US9980912, US9969942, US9963650, US9951280, US9951278, US9944837, US9944538, US9909067, US9850440, US9809564, US9809502, US9783565, US9670413, US9663733, US9644150, US9631145, US9617489, US9522392, US9518229, US9493380, US9493379, US9453166, US9447350, US9441887, US9422485, US9422478, US9410091, US9403140, US9382489, US9359268, US9353314, US9347005, US9333494, US9333474, US9328290, US9315739, US9284614, US9260666, US9169442, US9127224, US9127223, US9127208, US9120990, US9120989, US9120988, US9109177, US9102890, US9102889, US9102888, US9062264, US9044727, US9040761, US9035116, US9017428, US8968670, US8961743, US8951476, US8936654, US8927793, US8921628, US8864984, US8835704, US8772556, US8709239, US8704020, US8704019, US8669405, US8641895, US8628589, US8624070, US8623634, US8617261, US8568493, US8558043, US8557193, US8552233, US8524959, US8519203, US8513475, US8506658, US8487148, US8465557, US8460541, US8454712, US8431757, US8430937, US8425766, US8377152, US8372311, US8367881, US8344194, US8317892, US8317891, US8308911, US8293958, US8293952, US8288600, US8288599, US8277643, US8236173, US8236085, US8216430, US8173044, US8143464, US8137632, US8137628, US8063258, US8057641, US2015203761, US2014109470, US2013204054, US2013126296, US2013068997, US2012190092, US2012144730, US2012037486, US2012022307, US2011258913, US2011212004, US2011209386, US2011197511, US2011177466, US2011123407, US20111094147, US2010323435, US2010294643, US2010293839, US2010293838, US2010228068, US2010113849, US10240776, US10233129, US10173937, US10118870, US10106471, US10093588, US10066167, US10059634, US10041667, US10023503, KR101475582, JP5943489, JP2015524507, JP2015168812, JP2014510810, JP2014506273, JP2011173967, JP2010269952, JP2010053190, GB2460156, EP2689862, EP2689862, EP2689862, EP2683797, EP2683797, EP2683797, EP2655571, EP2655571, EP2653523, EP2653523, EP2652093, EP2652093, EP2652092, EP2652092, EP2595915, EP2435538, EP2435538, EP2340295, EP2340295, EP2199366, EP2105486, CN106669682, CN106669682, CN104662132, CN103442816, CN103261379, CN103261379, CN103261378, CN103261378, CN102822318, CN102361962, CN102051194,

Abstract:

A process is disclosed process for converting a solid or highly viscous carbon-based energy carrier material to liquid and gaseous reaction products, said process comprising the steps of: a) contacting the carbon-based energy carrier material with a particulate catalyst material b) converting the carbon-based energy carrier material at a reaction temperature between 200 degrees centigrade and 450 degrees centigrade, preferably between 250 degrees centigrade and 350 degrees centigrade, thereby forming reaction products in the vapor phase. In a preferred embodiment the process comprises the additional step of: c) separating the vapor phase reaction products from the particulate catalyst material within 10 seconds after said reaction products are formed; In a further preferred embodiment step c) is followed by: d) quenching the reaction products to a temperature below 200 degrees centigrade



5) Family number: 54294833 (US2014100396A)

© PatBase

Title: FORMATE-ASSISTED PYROLYSIS
Priority: US20120582958P 20120104 US20120600232P 20120217 US20120652018P 20120525
US20130734077 20130104 WO2013US20224 20130104

Family:	Publication number	Publication date	Application number	Application date
	BR112014016650 A2	20170613	BR20141116650	20130104
	BR112014016650 A8	20170704	BR20141116650	20130104
	BR112014016650 A8	20170704	BR20141116650	20130104
	BR112014016650 A8	20170613	BR20141116650	20130104
	CA2860507 AA	20140703	CA20132860507	20130104
	EP2800798 A1	20141112	EP20130733809	20130104
	EP2800798 A4	20151007	EP20130733809	20130104

MX2014008248 A1	20150220	MX20140008248	20130104
US2014100396 AA	20140410	US20130734077	20130104
US8981168 BB	20150317	US20130734077	20130104
WO13103768 A1	20130711	WO2013US20224	20130104

Probable Assignee: OF MAINE SYSTEM BOARD OF TRUSTEES UNIV

Assignee(s):(std): UNIV MAINE SYS BOARD TRUSTEES ; UNIV OF MAINE SYSTEM BOARD OF TRUSTEES

Assignee(s): VAN HEININGEN ADRIAAN R P ; WHEELER MARSHALL CLAYTON ; DESISTO WILLIAM JOSEPH ; OF MAINE SYSTEM BOARD OF TRUSTEES UNIV ; OF MAINE SYSTEM BOARD OF TRUSTEES UNIV107 MAINE AVENUEBANGORME04401US

Inventor(s):(std): WILLIAM JOSEPH DESISTO ; WHEELER MARSHALL CLAYTON ; VAN HEININGEN ADRIAAN R P ; MARSHALL CLAYTON WHEELER ; HEININGEN ADRIAAN R P VAN ; DESISTO WILLIAM JOSEPH ; ADRIAAN R P VAN HEININGEN

Inventor(s): DESISTO WILLIAM JOSEPHUS ; VAN HEININGEN ADRIAAN R PUS ; VAN HEININGEN ADRIAAN RP ; WHEELER MARSHALL CLAYTONUS

Agent(s): NORTON ROSE FULBRIGHT CANADA LLP SENCRL SRL; EIP; BRIAN E; CHOATE HALL AND STEWART LLP; REESE BRIAN E ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B09B3/00 C10B49/22 C10B53/02 C10B57/06 C10C5/00 C10G1/00 C10G3/00 C10K1/02 C10L1/04 (Advanced/Invention)

CPC: C10G1/002 C10B49/22 C10B53/02 C10B57/06 C10C5/00 C10G2300/1014 C10K1/024 Y02E50/14 Y02P30/20

US class: 585/240 585/242

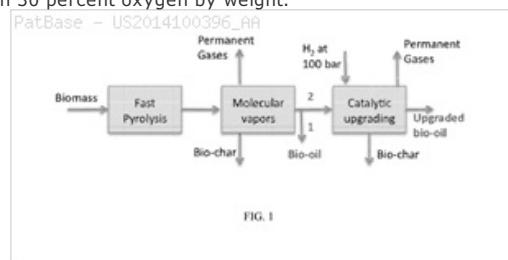
[Classification Explorer](#)

Cited documents: WO12106040 A2, WO11123897 A1, US6387221 BA, US4087373 A, US2012203043 AA, US2011232158 AA, US2011098503 AA, JP2500337 B2,

Forward Citations: WO15095498, US9902816, US9834490, US9206365, US2016200754, US2013174476, US10184213, CN103525443,

Abstract:

The present invention provides, among other thing, methods for creating significantly deoxygenated bio-oils from biomass including the steps of providing a feedstock, associating the feedstock with an alkali formate to form a treated feedstock, dewatering the treated feedstock, heating the dewatered treated feedstock to form a vapor product, and condensing the vapor product to form a pyrolysis oil, wherein the pyrolysis oil contains less than 30 percent oxygen by weight.



6) Family number: 68807555 (WO18042345A1)

© PatBase

Title: PRODUCTION SYSTEM AND PROCESS FOR OBTAINING BIO-OIL FROM BIOMASS

Priority: CO20160001515 20160831

Family:

Publication number	Publication date	Application number	Application date
CO20160001515 A1	20180419	CO20160001515	20160831
WO18042345 A1	20180308	WO20171B55212	20170830

Probable Assignee: UNIV NACIONAL DE COLOMBIA

Assignee(s):(std): UNIV NACIONAL DE COLOMBIA

Assignee(s): UNIVERSIDAD NACIONAL DE COLOMBIA

Inventor(s):(std): VALDES RENTERIA CARLOS FRANCISCO ; MONTOYA ARBELAEZ JORGE IVAN ; DE LA CRUZ MORALES JAVIER FERNANDO ; BLANCO LEAL LUZ ADRIANA ; OSORIO VELASCO JESSI ; MARRUGO ESCOBAR GLORIA PATRICIA ; LONDONO GIRALDO CARLOS ARTURO ; GOMEZ GUTIERREZ CARLOS ANDRES ; CHEJNE JANNA FARID

Inventor(s): CARLOS ANDRES GOMEZ GUTIERREZ ; CARLOS ARTURO LONDONO GIRALDO ; CARLOS FRANCISCO VALDES RENTERIA ; FARID CHEJNE JANNA ; GLORIA PATRICIA MARRUGO ESCOBAR ; JAVIER FERNANDO DE LA CRUZ MORALES ; JESSI OSORIO VELASCO ; JORGE IVAN MONTOYA ARBELAEZ ; LUZ ADRIANA BLANCO LEAL

Agent(s): PATRICIA ARROYAVE FRANCO; OLARTE CARLOS R

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): C10B49/00 C10L5/00 (Advanced/Invention)

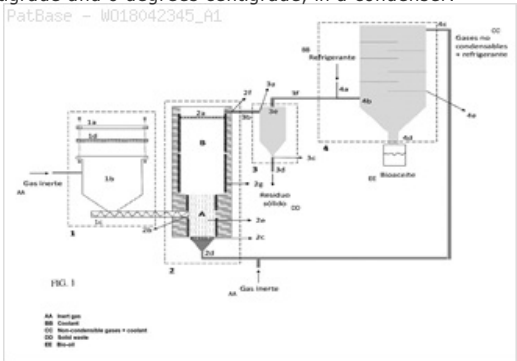
CPC: C10B49/00

[Classification Explorer](#)

Cited documents: WO14145223 A1, US7008459 BA, US5961786 A, US2011315537 AA, US2011201854 AA,

Abstract:

The invention relates to a system for generating bio-oil from biomass and a process for producing bio-oil from biomass. The system for producing bio-oil from biomass comprises: a mechanism for the continuous supply of biomass; a pyrolyser having a biomass inlet connected to the mechanism for the continuous supply of biomass, and having a mesh; a mechanism for separating solids connected to the pyrolyser; and a condenser connected to the mechanism for separating solids. The process for the production of bio-oil from biomass comprises the following steps: a) continuously supplying biomass to a pyrolyser; b) pyrolysing the biomass at a heating rate of greater than 1000 degrees C/s, to a temperature between 300 degrees centigrade and 750 degrees centigrade, and with a dwell time of less than 2 seconds, in the pyrolyser; c) separating particulate material present in the gases obtained via pyrolysis in step b), in a mechanism for separating solids; and d) condensing the gases obtained via pyrolysis that are condensable to a temperature between -30 degrees centigrade and 0 degrees centigrade, in a condenser.



7) Family number: 57792451 (MX2012014867A)

© PatBase

Title:	PROCESS FOR PRODUCING BIO-OIL, BIOFUEL, BIOGAS AND CARBON FROM SOLAR BIOMASS PYROLYSIS.			
Priority:	MX20120014867 20121217			
Family:	Publication number	Publication date	Application number	Application date
	MX2012014867 A1	20140624	MX20120014867	20121217
Probable Assignee:	UNIV AUTONOMA DE NUEVO LEON			
Assignee(s):(std):	UNIV AUTONOMA DE NUEVO LEON			
Assignee(s):	UNIVERSIDAD AUTONOMA DE NUEVO LEON			
Inventor(s):(std):	BLANCO CESAR ALBERTO SOSA ; CANTU MA ELENA RODRIGUEZ ; GUARDIOLA ROSA DEL CARMEN MIRANDA ; MARTINEZ DIANA BUSTOS ; VALDES SERGIO MORALES			
Inventor(s):	ROSA DEL CARMEN MIRANDA GUARDIOLA ; SERGIO MORALES VALDES ; MA ELENA RODRIGUEZ CANTU ; CESAR ALBERTO SOSA BLANCO ; DIANA BUSTOS MARTINEZ			
International class (IPC 8-9):	C02F11/10 (Advanced/Invention); B09B3/00 F23G5/00 (Core/Invention)			
CPC:	Y02W30/20			

[Classification Explorer](#)

Abstract:
THE PRESENT INVENTION PERTAINS TO THE CHEMICAL AREA FOCUSED ON THE PRODUCTION OF ENERGY BY MEANS OF RENEWABLE SOURCES. THIS METHOD IS USEFUL TO OBTAIN VALUABLE PRODUCTS WITH ENERGETIC APPLICATIONS MAINLY, SUCH AS: BIO-OIL, LIQUID BIOFUEL, BIOGAS AND CARBON BY A PYROLYSIS PROCESS USING A SOLAR SOURCE AS AN ENERGY PRINCIPLE. THE MOST COMMON PROCESSES IN THE THERMAL CONVERSION OF BIOMASS ARE THE PYROLYSIS, GASIFICATION AND COMBUSTION, WHICH ARE SOME OF THE MOST PROMISING NON-NUCLEAR FORMS OF FUTURE ENERGY (DEMIRBAS, 1998). THE BIOMASS IS AN AVAILABLE AND EASILY RENEWABLE ENERGY SOURCE THAT REDUCES EMISSIONS OF SULFUR DIOXIDE AND CARBON DIOXIDE, WHICH IS AN ATTRACTIVE OPTION FROM THE ECOLOGICAL POINT OF VIEW WHICH WOULD BE USED AS FUEL FOR THE GENERATION OF ENERGY. THE USE OF FUEL OBTAINED FROM BIOMASS RESULTS FROM THE NEED OF REDUCING GREENHOUSE GAS EMISSIONS AND REMOVING THE ACCUMULATION OF WASTES OF AGRICULTURAL PRODUCTS.

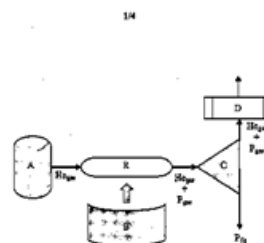


FIG. 1

8) Family number: 43296337 (US2009139851A)

© PatBase

Title: RAPID THERMAL CONVERSION OF BIOMASS

Priority: US20070943329 20071120 CN200880117154 20081110 WO2008US83040 20081110
US20110021508 20110204 US20150593831 20150109 US20170461062 20170316

Family:	Publication number	Publication date	Application number	Application date
	CA2705775 AA	20090528	CA20082705775	20081110
	CA2705775 C	20140114	CA20082705775	20081110
	CN101874099 A	20101027	CN200880117154	20081110
	CN105542810 A	20160504	CN201510900303	20081110
	CO6280427 A2	20110520	CO20100060219	20100520
	DK2231817 T3	20161010	DK20080851721T	20081110
	ECSP10010185 A	20101230	EC2010SP10185	20100518
	ECSP100185 A	20101230	EC2010SP00185	20100518
	EP2231817 A1	20100929	EP20080851721	20081110
	EP2231817 A4	20131204	EP20080851721	20081110
	EP2231817 B1	20160817	EP20080851721	20081110
	IN01706KN2010 A	20111125	IN2010KN01706	20100512
	MX2010005490 A1	20100910	MX20100005490	20081110
	MY147968 A	20130228	MY20100002243	20081110
	US2009139851 AA	20090604	US20070943329	20071120
	US2011123407 AA	20110526	US20110021508	20110204
	US2015191656 AA	20150709	US20150593831	20150109
	US2018030356 AA	20180201	US20170461062	20170316
	US7905990 BB	20110315	US20070943329	20071120
	US8961743 BB	20150224	US20110021508	20110204
	US9631145 BB	20170425	US20150593831	20150109
	WO09067350 A1	20090528	WO2008US83040	20081110

Probable Assignee: ENSYN RENEWABLES INC

Assignee(s):(std): ENSYN GROUP INC ; ENSYN RENEWABLES INC ; ENSYN REWABLES INC ; FREEL BARRY ; FREEL BARRY A

Assignee(s): VENTURE LENDING AND LEASING VII INC ; VENTURE LENDING AND LEASING VIII INC

Inventor(s):(std): FREEL BARRY ; FREEL BARRY A

Inventor(s): BARRY FREEL

Agent(s): SMART AND BIGGAR; JUANITA ACOSTA GOMEZ; BAKER COLIN JOHN; HOLZWARTH ROCHFORD ANDREAS; ORRICK HERRINGTON AND SUTCLIFFE LLP IP PROSECUTION DEPARTMENT; ORRICK HERRINGTON AND SUTCLIFFE LLP; JONES DAY

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B01J19/24 B01J8/18 C01B53/02 C01B9/00 C10B21/20 C10B27/00 C10B47/00 C10B49/00 C10B49/16 C10B49/22 C10B53/02 C10B57/00 C10B57/12 C10B9/00 C10G1/00 C10G1/02 C10G9/28 C10K1/04 F28C3/08 (Advanced/Invention); C10B49/00 C10B53/00 C10B9/00 (Core/Invention)

CPC: C10B49/22 C10B53/02 C10G1/02 C10K1/04 Y02E50/14 C10B57/00 C10B27/00 F28C3/08 C10G9/28 Y02P20/145 C10B9/00

European class: C10B49/22 C10B53/02 C10G1/02 C10G9/28 Y02E50/14

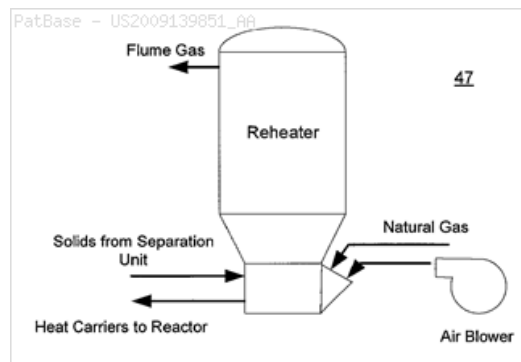
US class: 165/104.13 201/12 201/21 201/21S 201/23 201/23P 201/24 201/24S 201/25 201/28 201/28S 201/39 201/39S 202/108 202/115 202/121 202/208 202/215 202/222 202/262 202/99 208/131 261/128 422/140 422/187 422/187P 585/242

[Classification Explorer](#)

Cited documents: WO9744410 A1, WO9413827 A1, WO9218492 A1, WO9207842 A1, WO9111499 A1, WO12009207 A2, WO09126508 A2, WO09118363 A2, WO09118357 A1, WO09099684 A2, WO09047392 A1, WO09047387 A1, WO09019520 A2, WO08092557 A2, WO08020167 A2, WO08009643 A2, WO07128798 A1, WO07050030 A1, WO07045093 A1, WO07017005 A1, WO07017005 A1, WO0183645 A1, WO0109243 A1, US8961743 BB, US8524087 BB, US8277643 BB, US8207385 BB, US8202332 BB, US8153850 BB, US8147766 BB, US8097216 BB, US8043391 BB, US7999143 BB, US7999142 BB, US7998455 BB, US7998315 BB, US7982075 BB, US7960598 BB, US7956224 BB, US7943014 BB, US7905990 BB, US7897124 BB, US787946 A, US7625432 BB, US7578927 BB, US7572362 BB, US7563345 BB, US7491317 BB, US7479217 BB, US7476774 BB, US7473349 BB, US7319168 BB, US7285186 BB, US7263934 BB, US7262331 BB, US7247233 BA, US7240639 BB, US7226954 BB, US7202389 BA, US718392 A, US7026262 BA, US7022741 BB, US7004999 BB, US6988453 BB, US6962676 BA, US6960325 BB, US6875341 BA, US6844420 BA, US6814940 BA, US6808390 BA, US676023 A, US6759562 BB, US6743746 BA, US6676828 BA, US6660157 BB, US6656342 BB, US6555649 BB, US6547957 BA, US6485841 BA, US6455015 BA, US6452024 BA, US6339182 BA, US6237541 BA, US6193837 BA, US6190542 BA, US6113862 A, US6106702 A, US6002025 A, US5969165 A, US5961786 A, US5961786 A, US5879650 A, US5879650 A, US5879642 A, US5853548 A, US5792340 A, US5788784 A, US578503 A, US5744333 A, US5728271 A, US5728271 A, US5725738 A, US5713977 A, US5654448 A, US5605551 A, US5578092 A, US5520722 A, US5478736 A, US5426807 A, US5407674 A, US5380916 A, US5376340 A, US5371212 A, US5326919 A, US5292541 A, US5281727 A, US5243922 A, US5236688 A, US5225044 A, US5136117 A, US5093085 A, US5077252 A, US5041209 A, US5011592 A, US5009770 A, US4988430 A, US4987178 A, US4968325 A, US4942269 A, US4940007 A, US4931171 A, US4897178 A, US4891459 A, US4881592 A, US4880473 A, US4849091 A, US4823712 A, US4732091 A, US4714109 A, US4710357 A, US4678860 A, US4668243 A, US4645568 A, US4617693 A, US4615870 A, US4584947 A, US4574743 A, US4552203 A, US4548615 A, US4504379 A, US4495056 A, US4456504 A, US4443229 A, US4434726 A, US4422927 A, US4415434 A, US4373994 A, US4364796 A, US4344770 A, US4341598 A, US4336128 A, US4325327 A, US4321096 A, US4308411 A, US4306619 A, US4301771 A, US4300009 A, US4272402 A, US4245693 A, US4233119 A, US4219537 A, US4204915 A, US4153514 A, US4138020 A, US4103902 A, US4101414 A, US4064043 A, US4064018 A, US4052265 A, US4039290 A, US4003829 A, US3959420 A, US3959420 A, US3927996 A, US3925024 A, US3907661 A, US3890111 A, US3876533 A, US3853498 A, US3814176 A, US3776533 A, US3696022 A, US3694346 A, US3593968 A, US3467502 A, US3445549 A, US3313726 A, US3309356 A, US3130007 A, US2566353 A, US2380098 A, US2328202 A, US2326525 A, US2205757 A, US2012317871 AA, US2012279825 AA, US2012205289 AA, US2011258914 AA, US2011201854 AA, US2011146145 AA, US2011146141 AA, US2011146140 AA, US2011146135 AA, US2011139597 AA, US2011132737 AA, US2011123407 AA, US2011113675 AA, US2010325954 AA, US2010163395 AA, US2010162625 AA, US2010151550 AA, US2010147743 AA, US2010043634 AA, US2009321311 AA, US2009318737 AA, US2009308787 AA, US2009301930 AA, US2009294324 AA, US2009293344 AA, US2009287029 AA, US2009283442 AA, US2009259082 AA, US2009253948 AA, US2009253947 AA, US2009250376 AA, US2009227823 AA, US2009193709 AA, US2009188158 AA, US2009165378 AA, US2009139851 AA, US2009113787 AA, US2009090058 AA, US2009090046 AA, US2009084666 AA, US2009082604 AA, US2009082603 AA, US2009078611 AA, US2009078557 AA, US2009077868 AA, US2009077867 AA, US2009008292 AA, US2008318763 AA, US2008312476 AA, US2008282606 AA, US2008274022 AA, US2008274017 AA, US2008264771 AA, US2008236043 AA, US2008199821 AA, US2008194896 AA, US2008193345 AA, US2008185112 AA, US2008171649 AA, US2008161615 AA, US2008086937 AA, US2008081006 AA, US2008051619 AA, US2008050792 AA, US2008035526 AA, US2008029437 AA, US2007272538 AA, US2007205139 AA, US2007141222 AA, US2007000809 AA, US2006264684 AA, US2006180060 AA, US2006074254 AA, US2006016723 AA, US2005209328 AA, US2005167337 AA, US2003202912 AA, US2002146358 AA, US1252072 A, US1019133 A, SE99037426, SE9903742 A, JP58150793 A2, JP2007229548 A2, JP2001131560 A2, JP1277196 A2, JP1277196, JP11148625, GB1019133 A, EP1420058 A1, EP0787946 A1, EP0718392 A1, EP0676023 A1, EP0578503 A1, EP0105980 A1, CN1800307 A, CN1377938 A, CN101550347 A, CN101544901 A, CN101381611 A, CN101318622 A, CN101294085 A, CN101045524 A, CA2521829 A, CA2299049 AA, CA1312497, BR8304794 A, BR8304158 A,

Forward Citations: WO16200262, WO14031965, WO13090229, WO13090229, WO12142488, WO12115754, WO12115754, WO12092613, WO12092613, WO12092522, WO12092520, WO12092075, US9969942, US9951278, US9944837, US9920712, US9920268, US9920267, US9920252, US9868855, US9845440, US9845240, US9809564, US9783417, US9719020, US9670413, US9663719, US9631145, US9611439, US9611197, US9580315, US9518226, US9499404, US9447350, US9447325, US9441887, US9434885, US9422485, US9422478, US9410091, US9394171, US9387415, US9382489, US9371486, US9347005, US9315739, US9217110, US9206365, US9162171, US9127224, US9127223, US9127208, US9120990, US9120989, US9120988, US9109177, US9102890, US9102889, US9102888, US9085735, US9084977, US9068121, US9044727, US9040761, US9017428, US8999017, US8961743, US8952210, US8951308, US8936654, US8772556, US8709113, US8636888, US8623634, US8558043, US8557193, US8524959, US8476480, US8425633, US8298406, US8288600, US8206471, US8083900, US8057641, US2016177184, US2016002555, US2015191656, US2014238835, US2013204054, US2013174476, US2013078581, US2013062184, US2013023707, US2012214113, US2011154720, US2011139597, US2011123407, US2011023565, US2010294700, US2010281759, US2010162625, US2009217584, US10240776, US10222060, US10215401, US10214418, US10197015, US10197014, US10190066, US10190058, US10174267, US10167437, US10166519, US10099200, US10065858, US10041667, US10017700, US10011483, US10011482, US10000703, KR101352627, JP2014503353, EP2888020, EP2852657, EP2678405, EP2536677, DE102015108932, CN104718010, CN104350131, CN104236324, CN103429311, CN102950637, CN102712850, CN102226531, CN101885975,

Abstract:
The present invent provides improved rapid thermal conversion processes for efficiently converting wood, other biomass materials, and other carbonaceous feedstock (including hydrocarbons) into high yields of valuable liquid product, e.g., bio-oil, on a large scale production. In an embodiment, biomass material, e.g., wood, is feed to a conversion system where the biomass material is mixed with an upward stream of hot heat carriers, e.g., sand, that thermally convert the biomass into a hot vapor stream. The hot vapor stream is rapidly quenched with quench media in one or more condensing chambers located downstream of the conversion system. The rapid quenching condenses the vapor stream into liquid product, which is collected from the condensing chambers as a valuable liquid product. In one embodiment, the liquid product itself is used as the quench media.



9) Family number: 58177402 (US2016144351A)

© PatBase

Title: CATALYSTS USEFUL FOR BIOMASS PYROLYSIS AND BIO-OIL UPGRADING

Priority: US2013083856P 20130624 US20130839081P 20130625 US20140013020P 20140617
US20140899451 20140624 WO2014US43827 20140624 US20150899451 20151217
US20180014137 20180621

Family:

Publication number	Publication date	Application number	Application date
US2016144351 AA	20160526	US20140899451	20140624
US2018311657 AA	20181101	US20180014137	20180621
US10010881 BB	20180703	US20140899451	20140624
WO14209973 A1	20141231	WO2014US43827	20140624

Probable Assignee: BOARD OF SUPERVISORS OF LOUISIANA STATE UNIV AND AGRICULTURAL AND MECHANICAL COLLEGE

Assignee(s):(std): BOLDOR DORIN ; HAYES DANIEL ; UNIV LOUISIANA STATE ; SUERVISORS OF LOUISIANA STATE UNIV AND AGRICULTURAL AND MECHANICAL COLLEGE BOARD OF ; BOARD OF SUPERVISORS OF LOUISIANA STATE UNIV AND AGRICULTURAL AND MECHANICAL COLLEGE

Assignee(s): BOARD OF SUPERVISORS OF LOUISIANA STATE UNIV AND AGRICULTURAL AND MEDICAL COLLEGE ; BOARD OF SUERVISORS OF LOUISIANA STATE UNIV AND AGRICULTURAL AND MECHANICAL COLLEGE

Inventor(s):(std): BOLDOR DORIN ; HAYES DANIEL

Agent(s): JOHN H; RUNNELS JOHN H

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B01J21/00 B01J23/40 B01J23/42 B01J23/48 B01J23/52 B01J23/70 B01J29/40 B01J29/44 B01J35/00 B01J35/02 B01J37/00 B01J37/02 B01J37/06 B01J37/08 B01J37/12 B01J37/34 C10B19/00 C10B53/02 C10B57/06 C10G1/02 C10G1/08 C10G15/08 C10G3/00 C10G3/02 (Advanced/Invention); B01J29/40 B01J31/00 B01J35/02 B01J37/16 C10B19/00 (Advanced/Non-invention)

CPC: C10B53/02 C10B57/06 B01J23/42 B01J29/40 B01J31/00 B01J35/0033 B01J35/023 B01J37/0209 B01J37/0217 B01J37/0219 B01J37/0246 B01J37/16 C10G1/086 C10K3/02 Y02E50/14 B01J37/0225 C10B19/00 B01J23/40 B01J23/48 B01J23/52 B01J23/70 B01J29/44 B01J37/0221 B01J37/0226 B01J37/0228 B01J37/06 B01J37/12 B01J37/349 B01J2229/32 C10G3/44 C10G3/47 C10G15/08 C10G2300/1011 C10G2400/04 Y02P30/20 C10G1/06

US class: 201/2.5 252/71

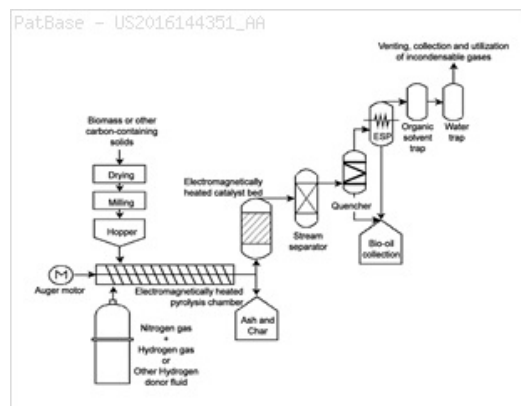
[Classification Explorer](#)

Cited documents: US7387712 BB, US7255726 BB, US6987079 BB, US2013213795 AA, US2006091499 AA,

Forward Citations: US9909078, US2016326444,

Abstract:

Catalysts useful in transforming biomass to bio-oil are disclosed, as are methods for making such catalysts, and methods of transforming biomass to bio-oil. The catalysts are especially useful for, but are not limited to, microwave- and induction-heating based pyrolysis of biomass, solid waste, and other carbon containing materials into bio-oil. The catalysts can also be used for upgrading the bio-oil to enhance fuel quality.



10) Family number: 52410641 (US8317883B)

© PatBase

Title: PRODUCTION OF STABLE PYROLYSIS BIO-OIL FROM MUSTARD FAMILY SEEDS, MUSTARD FAMILY SEED PRESSCAKE, AND DEFATTED MUSTARD FAMILY SEED PRESSCAKE

Priority: US20090459107 20090626 US20100907546 20101019

Family:

Publication number	Publication date	Application number	Application date
US8317883 BA	20121127	US20100907546	20101019

Probable Assignee: US AGRICULTURE

Assignee(s):(std): BOATENG AKWASI A ; GOLDBERG NEIL M ; JOHNSON PETER B ; MULLEN CHARLES A ; RAO SERIN R ; US AGRICULTURE ; SETH SUDHIR

Assignee(s): THE UNITED STATES OF AMERICA AS REPRESENTED BY THE SECRETARY OF AGRICULTURE ; SECRETARY OF AGRICULTURE US GOV AS ; SECRETARY OF AGRICULTURE AS US GOV

Inventor(s):(std): BOATENG AKWASI A ; GOLDBERG NEIL M ; JOHNSON PETER B ; MULLEN CHARLES A ; RAO SERIN R ; SETH SUDHIR

Agent(s): JOHN D; G BYRON

International class (IPC 8-9): C12P21/00 (Advanced/Invention)

CPC: C10L1/02 C10L2200/0469 C10L2290/02 C10C5/00 C10L5/447 C10B49/10 C10B53/02 C10K1/026 C10K1/028 C10K1/04 Y02E50/10 Y02E50/14 Y02E50/30 Y02P20/145

US class: 44/307 585/241

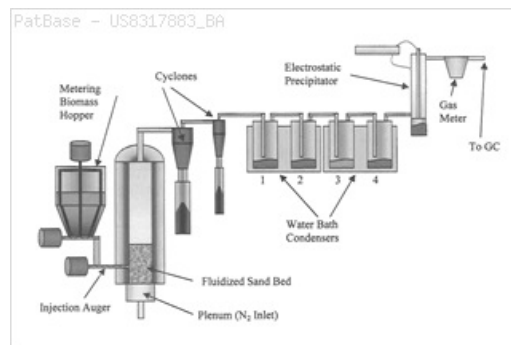
[Classification Explorer](#)

Cited documents: US6485841 BA, US2010279354 AA,

Forward Citations: WO14133757, US2016177184, KR101772166, KR101599358,

Abstract:

Bio-oil from a feedstock selected from mustard family seeds, mustard family seed presscake, mustard family seed defatted presscake, and mixtures thereof. The bio-oil is produced by a method involving (1) pyrolyzing the feedstock to produce bio-oil, bio-char and non-condensable gases, (2) removing the bio-char from the bio-oil, (3) condensing the bio-oil, and (4) precipitating the bio-oil.

**11) Family number: 49092823 (US2011139596A)**

© PatBase

Title: METHOD AND APPARATUS FOR PYROLYSIS OF A BIOMASS

Priority: US20100838629 20100719 WO2011US42592 20110630 US20110270913 20111011

Family:

Publication number	Publication date	Application number	Application date
BR112013001061 A2	20160524	BR20131101061	20110630
CA2804266 AA	20130102	CA20112804266	20110630
CN103124688 A	20130529	CN201180034392	20110630
DK2595915 T3	20190225	DK20110810141T	20110630
EP2595915 A1	20130529	EP20110810141	20110630
EP2595915 A4	20140709	EP20110810141	20110630
EP2595915 B1	20190102	EP20110810141	20110630
US2011139596 AA	20110616	US20100838629	20100719
US2012045371 AA	20120223	US20110270913	20111011
US8057641 BB	20111115	US20100838629	20100719
US8557193 BB	20131015	US20110270913	20111011
WO12012191 A1	20120126	WO2011US42592	20110630

Probable Assignee: INAERIS TECHNOLOGIES LLC

Assignee(s):(std): BARTEK ROBERT ; CORDLE RONALD LEE ; KIOR INC

Assignee(s): KHOSLA VENTURES III LP ; KFT TRUST VINOD KHOSLA TRUSTEE FIRST LIEN AGENT AS ; KIOR LLC ; INAERIS TECHNOLOGIES LLC ; KFT TRUST C O KHOSLA VENTURES ; 1538731 ALBERTA LTD AGENT AS

Inventor(s):(std): BARTEK ROBERT ; CORDLE RONALD LEE

Inventor(s): RONALD LEE CORDLE ; ROBERT BARTEK

Agent(s): ROBIC; KALHAMMER GEORG; HOVEY WILLIAMS LLP; ANDERSON JEFFREY R

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): B01J8/00 B01J8/08 C01B3/38 C07C1/06 C10B3/00 C10B49/20 C10B49/22 C10B53/00 C10B53/02 C10C5/00 C10G3/00 C11B3/00 (Advanced/Invention)

CPC: Y02P20/145 C10B49/22 C10B53/02 C10C5/00 Y02E50/14 Y02E50/32

European class: C10B49/22 C10B53/02 C10C5/00 Y02E50/14 Y02E50/32

US class: 201/12 201/12S 201/2.5 201/2.500P 201/35 201/36 201/38 201/39 202/99 202/99S 208/106 208/113 208/126 208/127 422/187 422/187P 422/207 422/214 422/647 44/605 44/606 585/240 585/241 585/242

[Classification Explorer](#)

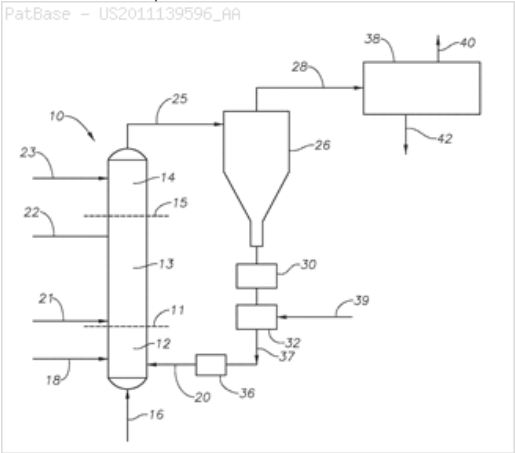
Cited documents: WO8101713 A1, WO10068748 A1, WO10002792 A2, WO09143017 A1, WO09118352 A1, WO08101949 A1, WO08020047 A2, WO08020047 A2, WO08011598 A2, WO08009643 A2, WO07128800 A1, WO07128799 A1, WO07128798 A1, WO06117006 A1, WO0214040 A1, WO02083816 A1, US7503981 BB, US7341973 BB, US7262331 BB, US7202389 BA, US7044999 BB, US6971594 BA, US6830597 BA, US6814940 BA, US6558530 BB, US6485774 BA, US6248297 BA, US6069012 A, US6035791 A, US6035791 A, US6022419 A, US5997728 A, US5961786 A, US5959167 A, US5954942 A, US5865898 A, US5792340 A, US5792340 A, US5728271 A, US5599510 A, US5547549 A, US5504259 A, US5233109 A, US5115084 A, US5102628 A, US5097088 A, US5087349 A, US5064527 A, US4994297 A, US4994297 A, US4987114 A, US4874507 A, US4851601 A, US4818372 A, US4749471 A, US4711873 A, US4308411 A, US4266083 A, US4153514 A, US4147593 A, US4064018 A, US3961913 A, US2763595 A, US2010163395 AA, US2010163395 AA, US2009308787 AA, US2009308787 AA, US2009227823 AA, US2009165378 AA, US2009139851 AA, US2009093555 AA, US2009013601 AA, US2008179219 AA, US2008179219 AA, US2008009055 AA, US2007213573 AA, US2007000177 AA, US2005145542 AA, US2004180971 AA, EP2107100 A1, EP2105486 A1, EP1878783 A1, EP1852492 A1, EP1852490 A1, EP1852466 A1, EP1719811 A1,

DE202006012176 U1

CN101747135 A, CN101558135 A, CA2618000 AA, CA1283880 A1,

Forward Citations: WO13164809, WO13103872, US9982317, US9969942, US9951278, US9809564, US9670413, US9663807, US9663733, US9644150, US9534174, US9441887, US9422485, US9422478, US9410091, US9353314, US9347005, US9303213, US9249362, US9238779, US9127224, US9127223, US9127208, US9120990, US9120989, US9120988, US9109177, US9102890, US9102889, US9102888, US9044727, US9035116, US9034620, US8951308, US8835704, US8815552, US8764890, US8524959, US2016200987, US2016177184, US2016002544, US2014027265, US2013167725, US2013078581, US2012271075, US2011219680, US2011067991, US10240776, US10041667, US10017700, CN107001941,

Abstract:
A method and apparatus for effective pyrolysis of a biomass utilizing rapid heat transfer from a solid heat carrier or catalyst. Particularly, various embodiments of the present invention provide methods and apparatuses which incorporate progressive temperature quenching and rapid disengagement of the heat carrier material and reaction product.



12) Family number: 60745931 (US2015321980A) © PatBase

Title: STABILIZATION OF PYROLYSIS BIO-OIL USING IN-SITU HYDROGENATION

Priority: US20140990182P 20140508 US20150696688 20150427

Family:

	Publication number	Publication date	Application number	Application date
■	US2015321980 AA	20151112	US20150696688	20150427
■	US10040735 BB	20180807	US20150696688	20150427
■	WO15171350 A1	20151112	WO2015US27892	20150428

Probable Assignee: EXXON MOBIL CORP

Assignee(s):(std): EXXONMOBIL RES AND ENG CO ; LEVIN DORON

Assignee(s): EXXON MOBIL CORP ; EXXONMOBIL RESEARCH AND ENGINEERING CO

Inventor(s):(std): LEVIN DORON

Agent(s): WARD ANDREW T; JENKINS AMANDA K; GUICE CHAD A ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): C07C29/141 C10B49/22 C10B53/02 C10B57/06 C10G3/00 (Advanced/Invention); B01J23/58 B01J23/63 B01J23/78 (Advanced/Non-invention)

CPC: C07C29/141 B01J23/58 B01J23/63 B01J23/78 C10B49/22 C10B53/02 C10B57/06 C10G3/45 C10G3/47 C10G3/48 C10G3/50 C10G2300/1014 Y02E50/14 Y02P20/145 Y02P30/20 Y02E50/32

US class: 568/881

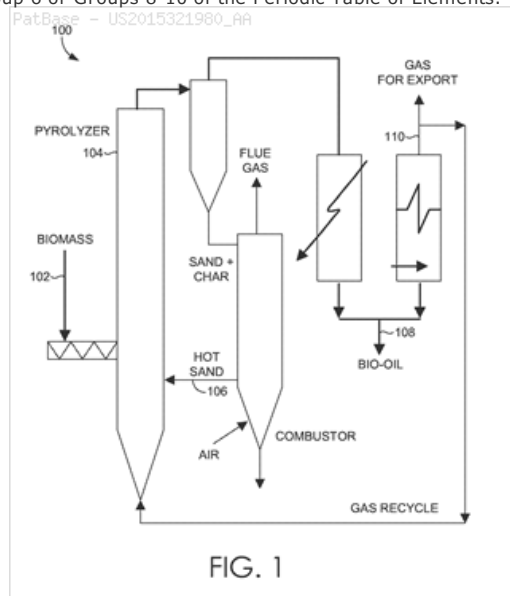
[Classification Explorer](#)

Cited documents: WO14023758 A2, US8293952 BB, US8202332 BB, US7513989 BA, US7468465 BB, US7435335 BA, US7411106 BB, US7378563 BB, US7319178 BB, US7307196 BB, US7288182 BA, US7288181 BB, US7244352 BB, US7220352 BB, US7199278 BB, US6995111 BB, US6951830 BB, US6844291 BB,

Forward Citations: WO17105817,

Abstract:

Methods are provided for producing an alcohol-containing pyrolysis product. Initially, a hydrocarbon feedstock is pyrolyzed in the presence of a catalyst system, the catalyst system comprising a basic metal oxide catalyst and a hydrogenation metal catalyst. A pyrolysis product is produced that contains at least one alcohol. The basic metal oxide catalyst is comprised of at least one metal from Group 2, Group 3 including Lanthanides and Actinides, or Group 4 of the Periodic Table of Elements, and the supported hydrogenation metal catalyst is comprised of at least one metal from Group 6 or Groups 8-10 of the Periodic Table of Elements.



13) Family number: 11729238 (US5792340A)

© PatBase

Title: METHOD AND APPARATUS FOR A CIRCULATING BED TRANSPORT FAST PYROLYSIS REACTOR SYSTEM

Priority: CA19902009021 19900131 WO1991CA00022 19910130 WO1991CA00022 19910130
US19920917066 19920730 US19940299820 19940901 US19950420376 19950407
US19980094945 19980615

Family:

Publication number	Publication date	Application number	Application date
AU199170701 A1	19910821	AU19910070701	19910130
CA2009021 AA	19910731	CA19902009021	19900131
CA2009021 C	20010911	CA19902009021	19900131
CS9100223 A3	19920415	CS19910000223	19910131
CZ280465 B6	19960117	CS19910000223	19910131
DE69106347 D1	19950209	DE19916006347	19910130
DE69106347 T2	19950511	DE19916006347T	19910130
DK0513051 T3	19950418	DK19910902648T	19910130
EP0513051 A1	19921119	EP19910902648	19910130
EP0513051 B1	19941228	EP19910902648	19910130
ES2065674 T3	19950216	ES19910902648T	19910130
FI106313 B	20010115	FI19920003434	19920730
FI923434 A	19920730	FI19920003434	19920730
FI923434 A0	19920730	FI19920003434	19920730
PL168638 B1	19960329	PL19910295592	19910130
US5792340 A	19980811	US19950420376	19950407
US5961786 A	19991005	US19980094945	19980615
WO9111499 A1	19910808	WO1991CA00022	19910130

Probable Assignee: ENSYN TECHNOLOGIES INC

Assignee(s):(std): ENSYN ENG ASS ; ENSYN TECHNOLOGIES INC

Assignee(s): ENSYN TECHNOLOGIES INC GREELY ONTARIO CA ; FREEL BARRY A ; GRAHAM ROBERT G ; ENSYN ENGINEERING ASSOCIATES ; ENSYN ENGINEERING ASSOCIATES INC ; ENSYN TECHNOLOGIES

Inventor(s):(std): FREEL BARRY A ; GRAHAM ROBERT G

Inventor(s): ROBERT G GRAHAM ; BARRY A FREEL

Agent(s): GOWLING LAFLEUR HENDERSON LLP

Designated states: AT AU BE CH DE DK ES FI FR GB GR HU IT JP LI LU NL NO PL SE SU US

International class (IPC 8-9): C10B49/20 C10B49/22 C10B53/00 C10B53/02 C10B53/07 C10B55/06 C10C5/00 (Advanced/Invention); C10B53/07 (Advanced/Non-invention); C10B49/00 C10B53/00 C10B53/07 C10C5/00 (Core/Invention)

International class (IPC 1-7): C10B1/04 C10B49/16 C10B49/20 C10B53/00 C10B53/02 C10B53/07 C10B55/06 C10G9/30 C10G9/32

CPC: Y02P20/143 C10B53/00 C10B49/20 C10B49/22 C10B53/02 C10B53/07 C10C5/00 Y02E50/14

European class: C10B49/20 C10B49/22 C10B53/00 C10B53/02 C10B53/07 C10C5/00 Y02E50/14

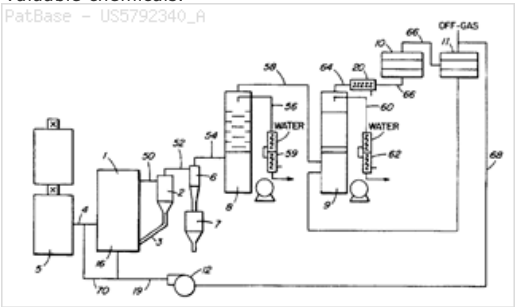
US class: 201/12 201/21 201/23 201/24 202/120 202/121 202/99 208/126 208/127 208/410 280/127 585/240 585/241 585/242

[Classification Explorer](#)

Cited documents: US5792340 A, US5326919 A, US5136117 A, US5092984 A, US4693808 A, US4507195 A, US4322222 A, US4298453 A, US4280876 A, US4260456 A, US4153514 A, US4147593 A, US4108732 A, US4106999 A, US4102773 A, US4087347 A, US4085030 A, US4083751 A, US4064018 A, US4039390 A, US3853498 A, US2735804 A, US2573906 A, CA932686 A1, CA536549 A, CA1283880, CA1108545 A1, CA1090732 A1, CA1050736 A1,

Forward Citations: WO9938935, WO9701616, WO9508022, WO19002445, WO18142211, WO18042345, WO17202837, WO17089339, WO17089312, WO17051008, WO16176255, WO16009333, WO15104320, WO15038754, WO15032367, WO14193997, WO14177668, WO14072583, WO14064261, WO14041212, WO14031965, WO13098195, WO13090229, WO13049665, WO12122224, WO12122224, WO12115754, WO12115754, WO12092613, WO12092522, WO12092522, WO12092520, WO12078422, WO12078422, WO12062924, WO12012191, WO11140401, WO11140401, WO11103054, WO11103054, WO11103047, WO11103047, WO11096912, WO10151361, WO10137858, WO10137858, WO10124406, WO09067350, WO08009643, WO08009643, WO07145507, WO07145507, WO07112570, WO06119219, WO06086867, WO02083816, WO0109243, WO0025996, US9994924, US9969942, US9951278, US9944857, US9944837, US9868855, US9850439, US9809564, US9719021, US9707532, US9670413, US9663733, US9631145, US9611439, US9518226, US9505984, US9469815, US9447350, US9441887, US9422485, US9422478, US9410091, US9394487, US9387415, US9382489, US9376628, US9371486, US9353314, US9347005, US9315739, US9200336, US9193926, US9127224, US9127223, US9127208, US9121644, US9120990, US9120989, US9120988, US9120980, US9109177, US9102890, US9102889, US9102888, US9084977, US9062525, US9044727, US9039790, US9035116, US9023197, US9017428, US9005573, US9005428, US9005313, US8999017, US8992885, US8968557, US8968556, US8961743, US8952210, US8940060, US8921634, US8920636, US8912378, US8907151, US8900416, US8877044, US8864982, US8858783, US8853475, US8835704, US8772558, US8772557, US8772556, US8764855, US8754275, US8709239, US8690977, US8689709, US8679325, US8663462, US8658029, US8657999, US8657960, US8642823, US8636958, US8636888, US8633344, US8623634, US8623321, US8618343, US8609921, US8609920, US8609919, US8609911, US8609910, US8586515, US8558043, US8557193, US8529687, US8524959, US8519203, US8518336, US8500959, US8499702, US8476480, US8460541, US8454712, US8449763, US8435402, US8435314, US8425766, US8425633, US8404910, US8404909, US8356992, US8354067, US8344194, US8298406, US8288600, US8288599, US8287697, US8277643, US8257580, US8236173, US8231696, US8203024, US8105482, US8101067, US8083900, US8062503, US8057641, US7985333, US7943014, US7909989, US7905990, US7901568, US7833512, US7811444, US7585407, US7572365, US7572362, US7569121, US7270743, US7247188, US7202389, US7199080, US7004999, US6844420, US6555649, US6534689, US6512090, US6485841, US6326461, US6316040, US5961786, US5952029, US5820640, US2016257889, US2015361362, US2015191656, US2015184098, US2015184025, US2015183961, US2015051428, US2014363343, US2013055936, US2012298561, US2012111766, US2012090977, US2012090221, US2012067773, US2012045371, US2012037486, US2012029252, US2012022307, US2012012039, US2011296745, US2011296742, US2011258912, US2011233114, US2011219680, US2011206571, US2011201855, US2011201854, US2011197511, US2011180459, US2011180458, US2011180454, US2011155648, US2011154720, US2011139597, US2011139596, US2011132737, US2011129408, US2011123407, US2011100359, US2011094147, US2011067991, US2011067305, US2011023565, US2010326880, US2010294700, US2010281759, US2010264062, US2010247730, US2010209965, US2010187162, US2010162625, US2010032348, US2009308787, US2009301937, US2009242377, US2009227823, US2009173668, US2009139851, US2009054711, US2008210602, US2008197012, US2008171899, US2008110744, US2008006519, US2007284283, US2007252313, US2007170095, US2007125369, US2006219544, US2006076274, US2005039599, US2004195226, US2004159186, US2004108251, US2004097369, US2004069686, US2004069682, US2002100711, US10240776, US10208262, US10190056, US10174259, US10167429, US10155908, US10041667, US10035964, US10023803, US10017700, TWI640471, RU2604845, RU2582607, KR20110085988, KR101683703, KR101285879, JP2018066008, JP2015500395, EP3421572, EP3093331, EP3081622, EP3070148, EP2912147, EP2888020, EP2852657, EP2683797, EP2678405, EP2653523, EP2653523, EP2595941, EP2595941, EP2595941, EP2595915, EP2536677, EP2435534, EP2435534, EP2430124, EP2336274, EP2275513, EP2275513, EP2231817, EP2231817, EP2231817, EP2209872, EP2107098, EP2007744, EP1420058, EP1420058, EP1377650, EP1311615, EP1124671, EP0670873, EP0670873, EA012888, DE102015107491, CN105542810, CN103443252, CN102449117, CN102449117, CN102015969, CN102015969, CN101874099, AU753794, AU737856, AU2007259532,

Abstract:
This invention generally relates to a new method and apparatus for the fast pyrolysis of carbonaceous materials involving rapid mixing, high heat transfer rates, precisely controlled short uniform residence times and rapid primary product quench in an upflow, entrained-bed, transport reactor with heat carrier solids recirculation. A carbonaceous feedstock, a non-oxidative transport gas and inorganic particulate heat supplying material are rapidly mixed in a reactor base section, then transported upward through an entrained-bed tubular reactor. A cyclonic hot solids recirculation system separates the solids from the non-condensable gases and primary product vapors and returns them to the mixer. Product vapors are rapidly quenched to provide maximum yields of liquids, petrochemicals, high value gases and selected valuable chemicals.



14) Family number: 63985721 (EP3093331A1)

© PatBase

Title:	METHOD AND SYSTEM FOR THE PRODUCTION AND COOLING OF PYROLYSIS TAR PROCEDE ET INSTALLATION DE FABRICATION ET DE REFOIDISSEMENT DE GOUDRO			
Priority:	EP20150400018 20150512			
Family:	Publication number	Publication date	Application number	Application date
	DE102015108932 A1	20161117	DE201510108932	20150605
	EP3093331 A1	20161116	EP20150400018	20150512
Probable Assignee:	AIR LIQUIDE			
Assignee(s):(std):	AIR LIQUIDE ; L AIR LIQUIDE SOC ANONYME POUR L ETUDE ET L EXPLOITATION DES PROCEDES GEORGES CLAUDE			
Inventor(s):(std):	DEMIR GAMZE ; GUENTHER ARMIN			

Agent(s): DROPSCH HOLGER

Designated states: AL AT BA BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

International class (IPC 8-9): C10B49/16 C10B49/18 C10B53/02 C10K1/04 C10K1/16 C10K3/00 (Advanced/Invention)

CPC: C10B53/02 C10B49/16 C10B49/18 C10K1/046 C10K1/16 Y02E50/14

[Classification Explorer](#)

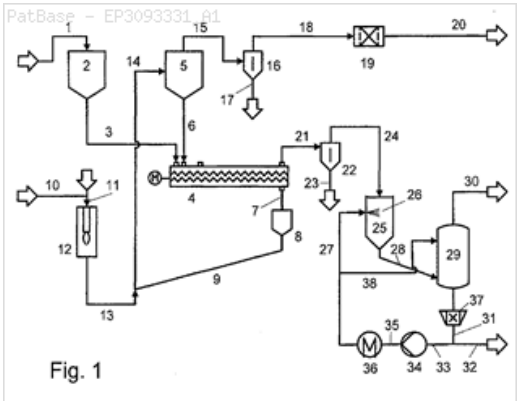
Cited documents: WO07017005 A1, WO03033624 A1, US7202389 BA, US2014318748 AA, US2012043194 AA, US2009139851 AA, EP0513051 A1,

DE102005053846 A1

DE102005037917 A1

DE10151054 A1,

Abstract:
Source: EP3093331A1 [DE] Es werden ein Verfahren und eine Anlage zur Schnellpyrolyse von Biomasse, insbesondere von Lignocellulose enthaltender Biomasse angegeben, bei denen die bereitgestellte Biomasse mit einem festen Waermetraeger unter Pyrolysebedingungen umgesetzt wird. Bei der nachfolgenden Auftrennung der Pyrolyseprodukte wird ein fluessiges Produkt, der Pyrolyseteer, erhalten, der auch als Kuehlmittel zur Abkuehlung der Pyrolyseprodukte verwendet wird. Erfindungsgemaess erfolgt die Temperatureinstellung des Kuehlmittels mit Waermetauschern des Typs Plattenwaermetauscher, Spiralwaermetauscher und Hohlschraubenrotationswaermetauscher. **Machine translation:** It will be a process and a system for the fast pyrolysis of biomass, in particular from lignocellulose-containing biomass indicates which provided biomass is converted with a solid heat carrier pyrolysis conditions. The subsequent separation of pyrolysis products obtained a liquid product of pyrolysis tar, which is used as a coolant for the cooling of pyrolysis products. Invention according to the temperature of the coolant heat exchangers of type plate heat exchangers, spiral heat exchanger with hollow screw Rotary heat exchangers is.



15) Family number: 15181487 (US5728271A)

© PatBase

Title:	ENERGY EFFICIENT LIQUEFACTION OF BIOMATERIALS BY THERMOLYSIS																																																																																																																												
Priority:	US19960650947 19960520		US19960712191 19960911		WO1997CA00226 19970404																																																																																																																								
Family:	<table><tr><th></th><th>Publication number</th><th>Publication date</th><th>Application number</th><th>Application date</th></tr><tr><td></td><td>AU199722829 A1</td><td>19971209</td><td>AU19970022829</td><td>19970404</td></tr><tr><td></td><td>AU725988 B2</td><td>20001026</td><td>AU19970022829</td><td>19970404</td></tr><tr><td></td><td>AU725988 C</td><td>20071115</td><td>AU19970022829</td><td>19970404</td></tr><tr><td></td><td>BRPI9709327 A</td><td>20000502</td><td>BR1997PI09327</td><td>19970404</td></tr><tr><td></td><td>CA2255922 AA</td><td>19971127</td><td>CA19972255922</td><td>19970404</td></tr><tr><td></td><td>CA2255922 C</td><td>20090707</td><td>CA19972255922</td><td>19970404</td></tr><tr><td></td><td>CN1141360 C</td><td>20040310</td><td>CN19971094819</td><td>19970404</td></tr><tr><td></td><td>CN1219192 A</td><td>19990609</td><td>CN19971094819</td><td>19970404</td></tr><tr><td></td><td>DK0904335 T3</td><td>20010611</td><td>DK19970915217T</td><td>19970404</td></tr><tr><td></td><td>EP0904335 A1</td><td>19990331</td><td>EP19970915217</td><td>19970404</td></tr><tr><td></td><td>EP0904335 B1</td><td>20010314</td><td>EP19970915217</td><td>19970404</td></tr><tr><td></td><td>ES2155249 T3</td><td>20010501</td><td>ES19970915217T</td><td>19970404</td></tr><tr><td></td><td>HK1020349 A1</td><td>20050422</td><td>HK19990105536</td><td>19991129</td></tr><tr><td></td><td>HK1020349 B</td><td>20050422</td><td>HK19990105536</td><td>19991129</td></tr><tr><td></td><td>ID16715 A</td><td>19971106</td><td>ID19960003209</td><td>19961106</td></tr><tr><td></td><td>JP2000510889 T2</td><td>20000822</td><td>JP19970541301T</td><td>19970404</td></tr><tr><td></td><td>JP4371433 B2</td><td>20091125</td><td>JP19970541301T</td><td>19970404</td></tr><tr><td></td><td>NO985387 A</td><td>19990118</td><td>NO19980005387</td><td>19981119</td></tr><tr><td></td><td>NO985387 A0</td><td>19981119</td><td>NO19980005387</td><td>19981119</td></tr><tr><td></td><td>TW375653 B</td><td>19991201</td><td>TW19960112844</td><td>19961019</td></tr><tr><td></td><td>US5728271 A</td><td>19980317</td><td>US19960650947</td><td>19960520</td></tr><tr><td></td><td>US5853548 A</td><td>19981229</td><td>US19960712191</td><td>19960911</td></tr><tr><td></td><td>WO9744410 A1</td><td>19971127</td><td>WO1997CA00226</td><td>19970404</td></tr></table>						Publication number	Publication date	Application number	Application date		AU199722829 A1	19971209	AU19970022829	19970404		AU725988 B2	20001026	AU19970022829	19970404		AU725988 C	20071115	AU19970022829	19970404		BRPI9709327 A	20000502	BR1997PI09327	19970404		CA2255922 AA	19971127	CA19972255922	19970404		CA2255922 C	20090707	CA19972255922	19970404		CN1141360 C	20040310	CN19971094819	19970404		CN1219192 A	19990609	CN19971094819	19970404		DK0904335 T3	20010611	DK19970915217T	19970404		EP0904335 A1	19990331	EP19970915217	19970404		EP0904335 B1	20010314	EP19970915217	19970404		ES2155249 T3	20010501	ES19970915217T	19970404		HK1020349 A1	20050422	HK19990105536	19991129		HK1020349 B	20050422	HK19990105536	19991129		ID16715 A	19971106	ID19960003209	19961106		JP2000510889 T2	20000822	JP19970541301T	19970404		JP4371433 B2	20091125	JP19970541301T	19970404		NO985387 A	19990118	NO19980005387	19981119		NO985387 A0	19981119	NO19980005387	19981119		TW375653 B	19991201	TW19960112844	19961019		US5728271 A	19980317	US19960650947	19960520		US5853548 A	19981229	US19960712191	19960911		WO9744410 A1	19971127	WO1997CA00226	19970404
	Publication number	Publication date	Application number	Application date																																																																																																																									
	AU199722829 A1	19971209	AU19970022829	19970404																																																																																																																									
	AU725988 B2	20001026	AU19970022829	19970404																																																																																																																									
	AU725988 C	20071115	AU19970022829	19970404																																																																																																																									
	BRPI9709327 A	20000502	BR1997PI09327	19970404																																																																																																																									
	CA2255922 AA	19971127	CA19972255922	19970404																																																																																																																									
	CA2255922 C	20090707	CA19972255922	19970404																																																																																																																									
	CN1141360 C	20040310	CN19971094819	19970404																																																																																																																									
	CN1219192 A	19990609	CN19971094819	19970404																																																																																																																									
	DK0904335 T3	20010611	DK19970915217T	19970404																																																																																																																									
	EP0904335 A1	19990331	EP19970915217	19970404																																																																																																																									
	EP0904335 B1	20010314	EP19970915217	19970404																																																																																																																									
	ES2155249 T3	20010501	ES19970915217T	19970404																																																																																																																									
	HK1020349 A1	20050422	HK19990105536	19991129																																																																																																																									
	HK1020349 B	20050422	HK19990105536	19991129																																																																																																																									
	ID16715 A	19971106	ID19960003209	19961106																																																																																																																									
	JP2000510889 T2	20000822	JP19970541301T	19970404																																																																																																																									
	JP4371433 B2	20091125	JP19970541301T	19970404																																																																																																																									
	NO985387 A	19990118	NO19980005387	19981119																																																																																																																									
	NO985387 A0	19981119	NO19980005387	19981119																																																																																																																									
	TW375653 B	19991201	TW19960112844	19961019																																																																																																																									
	US5728271 A	19980317	US19960650947	19960520																																																																																																																									
	US5853548 A	19981229	US19960712191	19960911																																																																																																																									
	WO9744410 A1	19971127	WO1997CA00226	19970404																																																																																																																									
Probable Assignee:	DYNAMOTIVE TECHNOLOGIES CORP																																																																																																																												
Assignee(s):(std):	DYNAMOTIVE ENERGY SYSTEMS CORP ; RTI RESOURCE TRANSFORMS INTERN ; RESOURCE TRANSFORMS INT L ; DYNAMOTIVE TECHNOLOGIES CORP																																																																																																																												
Assignee(s):	LIN RICHARD ; RESOURCE TRANSFORMS INT LTD ; RTI RESOURCE TRANSFORMS INT LTD ; RADLEIN DESMOND ; MAJERSKI PIOTR ; PISKORZ JAN ; RESOURCE TRANSFORMS INTIONAL ; RTI RESOURCE TRANSFORMS INT ; RESOURCE TRANSFORMS INT ; DYNAMOTIVE ENERGY SYSTEMS CORPORATIONCA ; DYNAMOTIVE ENERGY SYSTEMS ; DYNAMOTIVE ENERGY SYSTEMS 230 1700 WEST 75TH AVENUE CORP																																																																																																																												
Inventor(s):(std):	DESMOND RADLEIN ; JAN PISKORZ ; MAJERSKI PIOTR ; MAJERSKI PJOTR ; MAJETSKI PIOTR ; PIOTR																																																																																																																												

MAJERSKI ; PIOTR MAJETSKI ; PISKORZ JAN ; RADLEIN DESMOND

Agent(s): FREEHILLS PATENT AND TRADE MARK ATTORNEYS; FREEHILLS PATENT ATTORNEYS; FPA PATENT ATTORNEYS PTY LTD; SHAPIRO COHEN; SHAPIRO COHEN LLP; AVENTUM IP LAW LLP; CHINA SINDA INTELLECTUAL PROPERTY LTD ROOM 3410 34 F 118 CONNAUGHT ROAD WEST

Designated states: AL AM AT AU AZ BB BE BF BG BJ BR BY CA CF CG CH CI CM CN CZ DE DK EE ES FI FR GA GB GE GH GN GR HU IE IS IT JP KE KG KP KR KZ LK LR LS LT LU LV MC MD MG MK MN MW MX NL NO NZ PL PT RO RU SD SE SG SI SK SZ TJ TM TR TT UA UG UZ VN

International class (IPC 8-9): B01J B01J8/18 C10B47/24 C10B49/10 C10B53/02 C10G C10G1/00 C10G1/10 C10J3/00 C10J3/54 (Advanced/Invention); B01J8/18 C10B47/00 C10B53/00 C10G1/00 C10J3/00 C10J3/46 (Core/Invention); C10B49/10 (Core/Non-invention)

International class (IPC 1-7): B01J8/18 B04C7/00 C01G1/10 C10B47/24 C10B49/10 C10B53/02 C10G1/00 C10G1/10

CPC: C10C5/00 B01J8/1836 B01J2208/00176 C10B47/24 C10B53/02 C10G1/10 Y02E50/14

European class: B01J8/18H C10B47/24 C10B53/02 C10C5/00 C10G1/10 L01J208/00C2D4A Y02E20/18 Y02E50/14

US class: 201/25 201/31 201/36 201/7 201/8

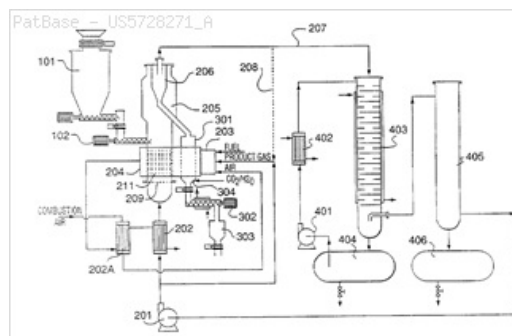
[Classification Explorer](#)

Cited documents: US5464876 A, US5413227 A, US5378323 A, US4848249 A, US4510021 A, US4153514 A, US4150021 A, US3933434 A, US3853498 A, EP0281218 A1, DE2234755 A1, CA1241541 A1, CA1163595 A1,

Forward Citations: WO17122005, WO16016241, WO15089556, WO15054519, WO14072583, WO13094382, WO13089892, WO12084953, WO12071005, WO12058431, WO12011803, WO11126792, WO11126792, WO11103313, WO11103313, WO11103054, WO11103054, WO11103047, WO11103047, WO11097584, WO10124406, WO10089342, WO09018531, WO06086867, WO02083816, WO0197988, US9994924, US9969942, US9957444, US9951278, US9944837, US9920712, US9920268, US9920267, US9920252, US9902907, US9868855, US9850439, US9845240, US9835329, US9809564, US9793563, US9783417, US9670413, US9631145, US9580315, US9518227, US9505991, US9499404, US9441887, US9422485, US9422478, US9410091, US9371486, US9347005, US9249358, US9226932, US9200336, US9127224, US9127223, US9127208, US9120990, US9120989, US9120988, US9109177, US9102890, US9102889, US9102888, US9085735, US9044727, US9017428, US8999017, US8979955, US8968433, US8961743, US8932373, US8772559, US8772556, US8690977, US8657960, US8651282, US8623634, US8579999, US8558044, US8558043, US8557193, US8545581, US8529644, US8524959, US8523963, US8500959, US8453584, US8298406, US8288600, US8287697, US8203024, US8202332, US8062410, US8057641, US8048178, US8039652, US7987613, US7943014, US7905990, US7895769, US7875090, US7625832, US7597751, US7540384, US7387712, US7199080, US7157401, US7004999, US6512090, US2015203771, US2015068113, US2013153395, US2013081934, US2013020188, US2013019529, US2012181160, US2012055077, US2011219680, US2011213188, US2011154720, US2011123407, US2011100359, US2011088320, US2011023565, US2010330441, US2010323435, US2010294700, US2010282588, US2010281759, US2010264015, US2010247730, US2010212215, US2010162625, US2010089741, US2009242377, US2009242376, US2009165378, US2009139851, US2009054711, US2009031932, US2008314726, US2008307703, US2008302703, US2008197012, US2008006519, US2007254807, US2007134137, US2007087933, US2005274065, US2005039599, US2004195226, US2004108251, US2004097369, US2004077485, US2004074760, US2004074759, US2003127363, US2003000822, US10240776, US10222060, US10215401, US10214418, US10197015, US10197014, US10099200, US10065858, US10041667, US10023803, US10017700, US10011483, US10011482, RU2472846, KR101788575, KR101744558, KR101308095, KR101182485, KR100857247, JP2018066009, JP2018066007, JP2013503923, JP2013094382, JP2013036009, JP2012528925, JP2011089136, JP2010116536, JP2008163257, FR3024221, EP3175193, EP3081622, EP3070148, EP2236588, EP2231817, EP2231817, EP2231817, EP2107099, EP2107098, EP1377650, EA012888, DE102015107491, CN106029837, CN101993700, CN101993700, CN101238197,

Abstract:

A thermolysis process for liquefaction of biomass solids in which specific and previously unrecognized conditions are employed. The thermolysis is carried out in a single fluidized bed of inert material operating at near atmospheric pressure, relatively low temperature, long solids and gas residence times and moderate heating rates. The distribution of the thermolysis products among liquid (bio-oil), solid (char) and gases under these conditions is unique. In particular, contrary to the prior art, both high liquid and low char yields are obtained. Furthermore the liquid is of similar composition to those obtained by so called fast pyrolysis processes of the prior art. The specified conditions are such as to allow production of liquids in high yields in an energy efficient manner. The low severity of the conditions in comparison with previous approaches allows simplified process design and scaleup leading to lower capital and operating costs as well as easier control.



16) Family number: 70409722 (US10017700B)

© PatBase

Title: BIOMASS PYROLYSIS REACTOR WITH INTEGRATED QUENCH AND METHOD FOR CONVERTING BIOMASS TO LIQUID BIO-OIL

Priority: US20140488337 20140917

Family:

Publication number	Publication date	Application number	Application date
US10017700 BA	20180710	US20140488337	20140917

Probable Assignee: MAINSTREAM ENG CORP

Assignee(s):(std): MAINSTREAM ENG CORP

Assignee(s): MAINSTREAM ENGINEERING CORP

Inventor(s):(std): SCHWARTZ NICHOLAS R ; YELVINGTON PAUL E ; ZASTROW DUSTIN J

International class B01J8/24 C10G1/08 (Advanced/Invention)
(IPC 8-9):

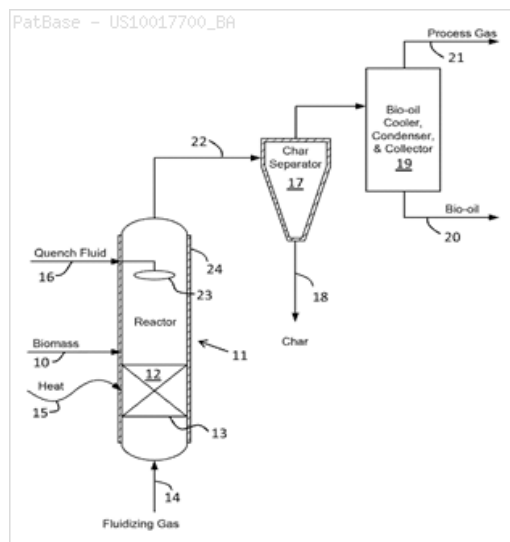
CPC: C10G1/08 B01J8/24 C10L1/02

[Classification Explorer](#)

Cited documents: US8057641 BB, US7905990 BB, US7004999 BB, US6844420 BA, US5961786 A, US5853548 A, US5270016 A, US5219530 A, US5059404 A, US4279734 A, US4278446 A, US4248834 A, US3959420 A, US3935288 A, US2680065 A, US2016798 A, US2011219680 AA, CA1241541 A1,

Abstract:

An apparatus and method are described for high-yield fast pyrolysis of biomass feedstock to produce a liquid bio-oil product. A bubbling fluidized bed reactor is provided having an integrated, rapid quench apparatus for minimizing secondary cracking reactions that can otherwise lower the yield of bio-oil. A quench stream is provided inside the reactor to minimize the residence time that the product vapors spend at high temperature where cracking can occur. The quench stream is introduced downstream of the fluidized bed but still internal to the reactor. The fluidized bed medium is constrained to the bottom of the reactor and is not cooled by the quench stream.



17) Family number: 55525682 (US2014073822A)

© PatBase

Title: ROTATING FLUIDIZED BED CATALYTIC PYROLYSIS REACTOR

Priority: US20120668574P 20120706 US20130936188 20130707

Family:	Publication number	Publication date	Application number	Application date
	US2014073822 AA	20140313	US20130936188	20130707
	WO14008496 A1	20140109	WO2013US49502	20130707

Probable Assignee: UNIV SOUTH DAKOTA

Assignee(s):(std): UNIV SOUTH DAKOTA

Assignee(s): ENERGY UNITED STATES DEPARTMENT OF ; SOUTH DAKOTA STATE UNIV

Inventor(s):(std): JULSON JAMES ; WEI LIN

Agent(s): NAKAMURA DEAN

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class B01J19/28 C10G1/00 C10G1/02 C10G9/04 C10L1/32 (Advanced/Invention)
(IPC 8-9):

CPC: B01J19/28 C10G1/002 C10G1/02 B01J8/002 B01J8/006 B01J8/1836 B01J8/32 B01J8/382 B01J2208/00212 B01J2208/00407 B01J2208/00433 B01J2208/00495 B01J2208/00513 B01J2208/0053 B01J2208/00672 B01J2208/00752 B01J2208/00769 C10B47/44 C10B53/02 Y02E50/14

US class: 422/186.3 422/187 422/198 422/209 44/307 585/16 585/240

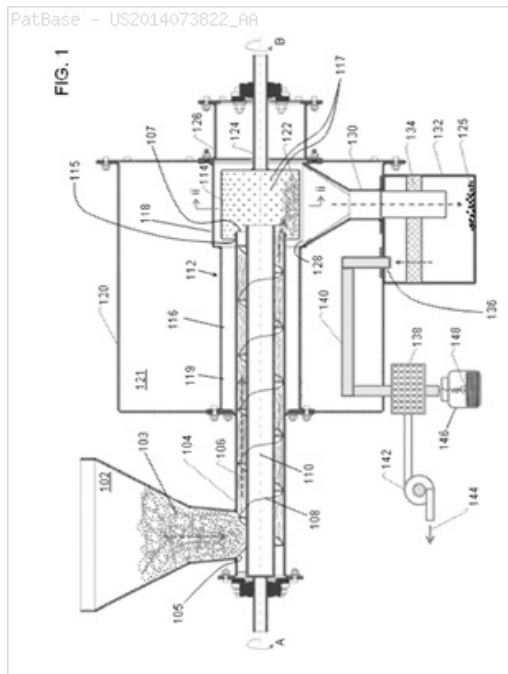
[Classification Explorer](#)

Cited documents: WO13077748 A2, WO12085880 A2, WO10130988 A1, WO07007068 A1, US6048374 A, US4260456 A, US2723226 A, US2013341175 AA, US2013256113 AA, US2013199919 AA, US2011265373 AA,

Forward Citations: US9670414, US2016251580, US2014221688, CN106378348, CN106378348, CN105623685,

Abstract:

Reactors for the pyrolysis of pyrolyzable matter, pyrolysis systems incorporating the reactors and methods of using the reactors are provided. Also provided are systems and methods for integrating the pyrolysis and hydrodeoxygenation of pyrolyzable matter. The pyrolysis reactors create a horizontally rotating, fluidized-bed to which pyrolyzable matter, such as biomass, may be converted via pyrolysis into liquid fuels and/or value-added chemicals.

**18) Family number: 59955983** (US2016347626A)

© PatBase

Title: MULTI-MEDIA STRATIFIED FILTRATION**Priority:** US20140930495P 20140123 RU20160134044 20150122 WO2015US12354 20150122
US20150112064 20150122

Family:	Publication number	Publication date	Application number	Application date
	AU2015209384 AA	20160908	AU20150209384	20150122
	AU2015209384 BB	20190214	AU20150209384	20150122
	BR112016015538 A2	20170808	BR20161115538	20150122
	CA2937652 AA	20160721	CA20152937652	20150122
	CA2937652 C	20180821	CA20152937652	20150122
	CN105916562 A	20160831	CN201580005515	20150122
	CN105916562 B	20181218	CN201580005515	20150122
	CO20160000096 A2	20170209	CO20160000096	20160722
	EP3096854 A1	20161130	EP20150710291	20150122
	IN201617027823 A	20170106	IN201617027823	20160816
	KR20160107340 A	20160913	KR20167023061	20150122
	MX2016009431 A1	20161013	MX20160009431	20150122
	PE09102016 A1	20160903	PE20160001001	20150122
	RU2016134044 A	20180301	RU20160134044	20150122
	RU2016134044 A3	20180301	RU20160134044	20150122
	RU2648055 C2	20180322	RU20160134044	20150122
	SG11201605852R A1	20160830	SG20161105852	20150122
	TH182862 A	20190124	TH20161004168	20150122
	US2016347626 AA	20161201	US20150112064	20150122
	US10189723 BB	20190129	US20150112064	20150122
	WO15112664 A1	20150730	WO2015US12354	20150122
	ZA201605137 A	20170927	ZA20160005137	20160722

Probable Assignee: SIEMENS ENERGY INC**Assignee(s):**(std): SIEMENS ENERGY INC ; SIEMENS ENERDZHI INK**Assignee(s):** WIERCINSKI SHANE P ; FELCH CHAD L ; LORGE ERIC A ; PATTERSON MATTHEW R**Inventor(s):**(std): FELCH CHAD L ; LORGE ERIC A ; LORGE ERIK A ; MATTEW R PATTERSON ; PATTERSON MATTHEW R ; PATTERSON METTYU R ; SHANE P WIERCINSKI ; CHAD L FELCH ; ERIC A LORGE ; VIRTSINSKI SHEJN P ; WIERCINSKI SHANE P**Inventor(s):** ERIC LORGE A ; CHAD FELCH L ; SHANE WIERCINSKI P ; MATTHEW PATTERSON R ; MATTHEW R PATTERSON**Agent(s):** SPRUNSON AND FERGUSON; SMART AND BIGGAR; CAROLINA MERCEDES DAZA MONTALVO; ISARPATENT; OOO YURIDICHESKAYA GORODISSKIY I PARTNERIYA FA; RASHIDI YAZD SEYED KAVEH E**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW**International class** B01D B01D17/02 B01D17/04 B01D24/02 B01D24/46 B01D24/48 C02F C02F1/28 (Advanced/Invention);
(IPC 8-9): C02F101/32 C02F103/36 (Advanced/Non-invention);
B01D17/02 (Core/Invention)**CPC:** C02F1/285 C02F1/288 B01D17/0202 B01D17/045 C02F1/286 C02F2101/32 C02F2303/16 B01D17/02 B01D24/02 C02F1/28 C02F2103/365 C02F2209/03**US class:** 210/671[Classification Explorer](#)

Cited documents: WO12119033 A1, WO10036690 A1, US5543037 A, US5350505 A, US4530767 A, US4329226 A, US201414305724, US2012223020 AA, US2011163049 AA, US201113119497, US2003047522 AA, RU2503483 C2, RU2311228 C1, RU2206520 C1, KZ18699 A, JP63315108 A2, JP59123505 A2, JP56033013 A2, JP56033013 A, JP3249994 A2, GB1442085 A, CN2472784 Y, CN2321513 Y, CN103111104 A, CN101186400 A,

Forward Citations: WO18231489, FR3070870,

Abstract:

According to various aspects and embodiments, a system and method for treating a feed stream comprising hydrocarbons, suspended solids, and an aqueous-based liquid is provided. The systems and methods may utilize a stratified multi-media bed that includes at least one layer of a composite media comprising a mixture of a cellulose-based material and a polymer. According to certain aspects, contacting the feed stream with the stratified multi-media bed comprises coalescing and filtering the feed stream. According to at least one aspect, the systems and methods include a draft tube positioned within the stratified multi-media bed that may be utilized for backwashing the layers of filter media.

