

(43) International Publication Date
26 November 2009 (26.11.2009)(10) International Publication Number
WO 2009/143531 A3(51) International Patent Classification:
C07C 51/21 (2006.01) C07C 63/26 (2006.01)

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(21) International Application Number:
PCT/US2009/045199

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(22) International Filing Date:
26 May 2009 (26.05.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/055,890 23 May 2008 (23.05.2008) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

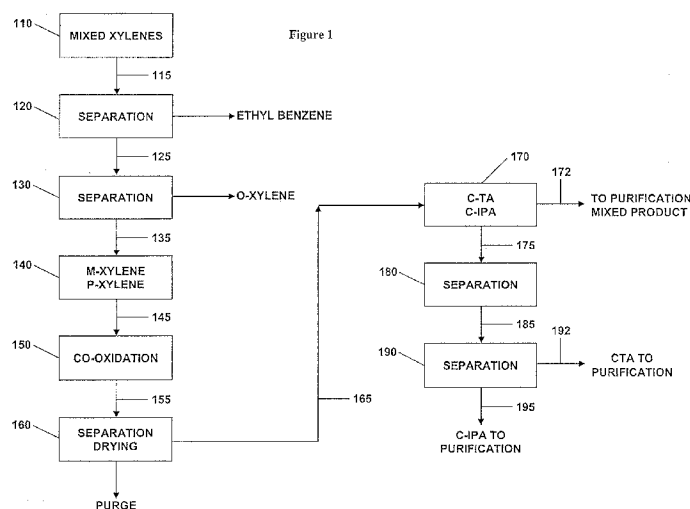
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

[Continued on next page]

(54) Title: CATALYST SYSTEMS FOR THE PRODUCTION OF ACIDS



(57) Abstract: Various embodiments of the invention herein described generally relate to novel processes for the production of aromatic acids by fixed bed catalytic oxidation of aromatic compounds carrying at least one oxidizable substituent group attached directly to the carbon atom of the corresponding aromatic nucleus. In an embodiment, a novel oxidation process of the present invention comprises the steps of: a) catalytically oxidizing, with an oxidation catalyst, a liquid phase aromatic acid precursor in the presence of a gaseous oxygen source; b) separating a finished product; c) purging the solvent and the oxidation catalyst; d) optionally recycling at least a portion of the solvent into the oxidation reactor; e) recovering at least a portion of the oxidation catalyst; f) recharging the at least a portion of the oxidation catalyst over a solid recharging catalyst bed; and (g) feeding a reactivated oxidation catalyst to the oxidation reactor.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
18 March 2010

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/045199**A. CLASSIFICATION OF SUBJECT MATTER***C07C 51/21(2006.01)i, C07C 63/26(2006.01)i*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC : C07C 51/21, C07C 63/26

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

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

eKOMPASS(KIPO internal), PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 7,314,954 B1 (David Yen) 01 Jan. 2008 See the abstract, figure 2; and the claims.	1-3, 11 6, 9, 10
X	KR 10-1999-0031350 A (SKC CO., LTD.) 06 May 1999 See the abstract; examples; and claim 1.	7
Y	US 6,359,186 B1 (Gerard Hotier et al.) 19 Mar. 2002 See the abstract; figures; and the claims.	6, 9, 10
Y	JP 14-543172 A (Samsung General Chemical Co., Ltd.) 17 Dec. 2002 See the abstract; and the claims.	6, 9, 10
Y	US 2005/0272951 A1 (Sergio Noe') 08 Dec. 2005 See the abstract; figure; the description paragraph [0003]; and the claims.	6, 9, 10
Y	US 5,068,406 A (Juergen K. Holzhauser et al.) 26 Nov. 1991 See the abstract; and claim 1-3	6, 9, 10
A	EP 0,335,501 A1 (AMOCO Corp.) 04 Oct. 1989 See the abstract; and the claims.	1-3, 6, 7, 9-11

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

13 JANUARY 2010 (13.01.2010)

Date of mailing of the international search report

14 JANUARY 2010 (14.01.2010)

Name and mailing address of the ISA/KR

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

Facsimile No. 82-42-472-7140

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/045199

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 08-157415 A (MITSUBISHI GAS CHEM CO INC et al.) 18 June 1996 See the abstract; and the claims.	1-3, 6, 7, 9-11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/045199**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☒ Claims Nos.: 4, 5, 8, 12, 13
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

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

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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INTERNATIONAL SEARCH REPORT

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		None	