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4 March 2010

(54) Title: CONTINUOUS PROCESS TO PRODUCE HEXAFLUOROISOPROPANOL

(57) Abstract: A continuous process for producing hexafluoroisopropanol is provided which comprises contacting hexafluoroacetone with hexafluoroisopropanol and hydrogen to produce a liquid feed stream; introducing the liquid feed stream to a reactor containing an immobilized hydrogenation catalyst to convert the hexafluoroacetone to hexafluoroisopropanol and provide a product stream; and recovering at least a portion of the hexafluoroisopropanol from the product stream. Preferably a portion of the product stream is recycled. The reactor can be a packed bed or stirred tank reactor.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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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)

C07C

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3 607 952 A (LEE KUNG HSING) 21 September 1971 (1971-09-21) claims 1-7 column 1, line 39 - line 46 column 1, line 65 - line 75 column 2, line 17 - line 25 abstract	1-10
Y	US 7 041 857 B1 (HAYES KATHRYN SUE [US] ET AL) 9 May 2006 (2006-05-09) abstract examples 3-5 claims 1-11	1-10



Further documents are listed in the continuation of Box C.



See patent family annex.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 256 163 A (AUGUSTINE ROBERT L [US] ET AL) 26 October 1993 (1993-10-26) abstract column 1, last paragraph - column 2, paragraph 1 column 2, line 13 - column 3, line 21 claims 1-5 -----	1-10
Y	PETER CLARK, MARTYN POLIAKOFF, ANDY WELLS: "Continuous Flow Hydrogenation of a Pharmaceutical Intermediate, [4-(3,4-Dichlorophenyl)-3,4-dihydro-2H-naphthalenydene]methylamine, in Supercritical Carbon Dioxide" ADVANCED SYNTHESIS & CATALYSIS, vol. 349, no. 17-18, 21 November 2007 (2007-11-21), pages 2655-2659, XP002559893 page 2656; figure 1 page 2656, left-hand column, paragraph 2 - page 2656, right-hand column, paragraph 1 -----	1-10

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/046078

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3607952	A	21-09-1971 NL 7004429 A	23-06-1970
US 7041857	B1	09-05-2006 AR 057791 A1	19-12-2007
		AT 411269 T	15-10-2008
		AU 2006204662 A1	22-03-2007
		CA 2558194 A1	07-03-2007
		CN 1927794 A	14-03-2007
		EP 1762554 A1	14-03-2007
		JP 2007070358 A	22-03-2007
		KR 20070028230 A	12-03-2007
		ZA 200607424 A	25-06-2008
US 5256163	A	26-10-1993 NONE	