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(54) Title: HCL RECOVERY IN FLUORO-CHEMICAL PROCESSES TO PRODUCE HIGH QUALITY ANHYDROUS HCL OR
AQUEOUS HCL OF SPECIFIC CONCENTRATION

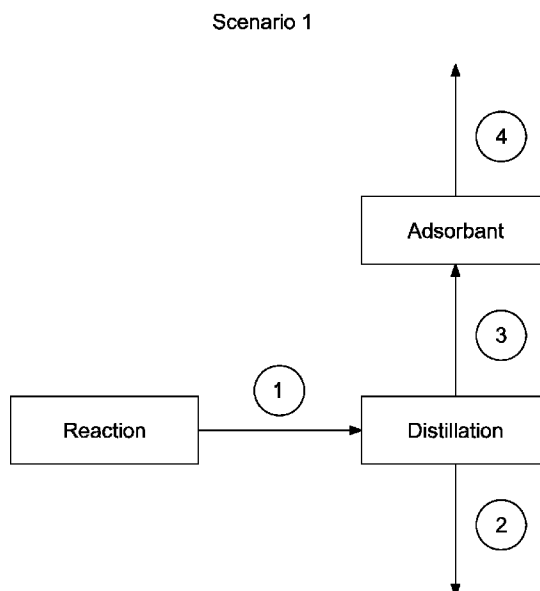


FIG. 1

(57) Abstract: The invention relates to HCl recovery and purification from fluorochemical raw product streams.

SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER INV. C07C17/383 C07C21/18 C07C17/389 C01B7/01 ADD.		
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 C01B 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) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2011/077191 A1 (ARKEMA FRANCE; PIGAMO ANNE [FR] ET AL.) 30 June 2011 (2011-06-30) page 6 figure 2 -----	1 - 13, 20 - 27
Y	KR 2000 0059438 A (ULSAN CHEMICAL CO LTD [KR]) 5 October 2000 (2000-10-05) paragraph [0009] paragraph [0013] paragraph [0020] table 1 -----	1 - 13, 20 - 27
☐ 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 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 2 December 2024		Date of mailing of the international search report 03/02/2025
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Karolak, Ewelina

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2024/038694

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

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

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

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

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

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims;; it is covered by claims Nos.:
1 - 13, 20 - 27

Remark on Protest

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

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-13, 20-27

a process comprising passing a fluorochemical product stream containing at least one of a fluoroolefin, fluorochloroolefin, HCFO, HFC, HCO, HCFC, chloroolefin product, HCl, HF and optionally COF₂ and moisture to at least one distillation column, contacting the overhead stream with an absorber adapted to remove HF, moisture and optionally COF₂, and withdrawing anhydrous HCl and a system for performing the process

2. claims: 14-19

system comprising a fluorochemical process reactor, first and second reactant flow lines, a discharge line and at least one distillation column or decanter

3. claims: 28, 30

composition comprising HCl and/or HF, at least one of 346mdf, 1336mzz(E), 1336mzz(Z), 356mff, 133a, 1327mz

4. claim: 29

composition comprising 113a, 123, 143a, 1316mxx(Z), 1316mzz(E), HF, HCl, H₂

5. claim: 31

composition comprising HCl, H₂, 143a

6. claims: 32-34

composition consisting essentially of HCl

7. claims: 35-37

process for contacting a fluorochemical product stream containing at least one of a fluoroolefin, fluorochloroolefin, HCFO, HFC, HCO, HCFC, chloroolefin product, HCl, HF with a membrane

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2024/038694

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2011077191 A1	30-06-2011	US 2011155942 A1	30-06-2011
		US 2012172637 A1	05-07-2012
		WO 2011077191 A1	30-06-2011

KR 20000059438 A	05-10-2000	NONE	
