



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : C01F 7/56, 7/00, C02F 1/52</p>	<p>A3</p>	<p>(11) International Publication Number: WO 97/11029</p> <p>(43) International Publication Date: 27 March 1997 (27.03.97)</p>
<p>(21) International Application Number: PCT/US96/13977</p> <p>(22) International Filing Date: 29 August 1996 (29.08.96)</p> <p>(30) Priority Data: 60/007,084 18 September 1995 (18.09.95) US 60/015,407 15 April 1996 (15.04.96) US</p> <p>(71) Applicant (for all designated States except US): DELTA CHEMICAL CORPORATION [US/US]; 2601 Cannery Avenue, Baltimore, MD 21226-1595 (US).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): DULKO, James, M. [US/US]; 7893 Pepperbox Lane, Pasadena, MD 21122 (US).</p> <p>(74) Agent: SANZO, Michael, A.; Vinson & Elkins, 1455 Pennsylvania Avenue, N.W., Washington, DC 20004-1008 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 15 May 1997 (15.05.97)</p>	
<p>(54) Title: POLYALUMINUM CHLORIDES AND POLYALUMINUM CHLOROSULFATES METHODS AND COMPOSITIONS</p>		
<p>(57) Abstract</p>		
<p>The present invention is directed to a process for the production of polyaluminum chlorides and polyaluminum chlorosulfates useful as coagulants in water treatment. In addition, the invention is directed to the products made by the disclosed processes.</p>		

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 96/13977

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C01F7/56 C01F7/00 C02F1/52

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 6 C01F C02F

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 285 282 (BEECHAM GROUP PLC) 5 October 1988 see claims 3,4 ---	34
X	EP,A,0 393 275 (WESTWOOD CHEMICAL CORP) 24 October 1990 see page 4, line 46 - line 52 ---	34
A	US,A,3 929 666 (AIBA YOSHIKAZU ET AL) 30 December 1975 cited in the application see the whole document ---	1-34
A	US,A,4 877 597 (HAASE DIETER ET AL) 31 October 1989 see the whole document ---	1-5
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

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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

24 January 1997

Date of mailing of the international search report

09. 04 97

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INTERNATIONAL SEARCH REPORT

International Application No
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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.
A	EP,A,0 327 419 (ATOCHEM ELF SA) 9 August 1989 cited in the application ---	
A	CHEMICAL ABSTRACTS, vol. 94, no. 16, 20 April 1981, Columbus, Ohio, US; abstract no. 124070, SUMITOMO ALUMINIUM SMELTING CO., LTD., JAPAN ET AL 'Water-soluble basic aluminum salt production' see abstract & JP,A,55 140 718 (SUMITOMO ALUMINIUM SMELTING CO., LTD., JAPAN;ASAHI KAGAKU KOGYO K. K.) -----	

INTERNATIONAL SEARCH REPORT

national application No.
PCT/US 96/ 13977**Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

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

1. Claims : 1-35 Preparation of polyaluminium chloride and polyaluminium chlorosulfates
2. Claims : 36-40 Preparation of a water purifying composition comprising polyaluminium chloride or polyaluminium chlorosulfates

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. No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 96/13977

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