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## Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

## (54) Title: PROCESS FOR RECOVERING SUBSTANCES FROM HIGH SALINITY LIQUIDS

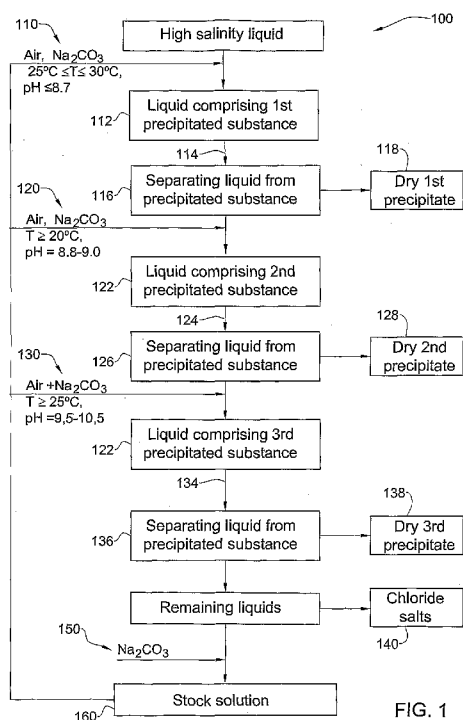


FIG. 1

(57) Abstract: The present disclosure provides a process for recovering from high salinity liquid a substance comprising a selected alkaline earth carbonate salt, the process comprises (i) adding to said high salinity liquid a reagent comprising a solution of an alkali metal carbonate in an amount sufficient to allow precipitation of said substance in said liquid, while continuously introducing into the liquid a gas whereby a high degree of precipitate is formed in the liquid; and (ii) isolating said precipitate from the liquid, wherein said precipitate comprising the alkaline earth carbonate comprising substance in an essentially purified form (at least 95%w/w degree of purity). Also provided are a unit and a system constructed and operative for performing the process, preferably continuously.



— *of inventorship (Rule 4.17(iv))*

**Published:**

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

— *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))*

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# INTERNATIONAL SEARCH REPORT

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PCT/IL2008/001100

## A. CLASSIFICATION OF SUBJECT MATTER

INV. C01F5/24 C01F11/18 C01B31/24 C01D3/06

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)

C01F

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, CHEM ABS Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|-----------|--|-----------------------|
| X         | US 4 115 219 A (GANCY ALAN B ET AL)<br>19 September 1978 (1978-09-19)<br>the whole document  | 1-36                  |
| X         | US 3 128 248 A (HIDETOMO SUZUKI)<br>7 April 1964 (1964-04-07)<br>the whole document  | 1-36                  |
| X         | US 2006/105082 A1 (ZEIGLER ARTHUR W [US]<br>ZEIGLER ARTHUR WILLIAM [US])<br>18 May 2006 (2006-05-18)<br>cited in the application<br>paragraph [0043] - paragraph [0048];<br>figure 1<br>-/-- | 33-36                 |

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

\* Special categories of cited documents:

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## INTERNATIONAL SEARCH REPORT

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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. |
|-----------|---|-----------------------|
| X,P       | & US 7 261 912 B2 (ZEIGLER ARTHUR W [US]<br>ZEIGLER ARTHUR WILLIAM [US])<br>28 August 2007 (2007-08-28)<br>cited in the application<br>column 4, line 29 - column 5, line 50;<br>figure 1<br>-----  | 33                    |
| A         | PACKTER A ET AL: "The precipitation of<br>alkaline-earth metal carbonate powders<br>from aqueous solution. Crystal numbers and<br>final sizes"<br>KRISTALL UND TECHNIK, AKADEMIE-VERLAG.<br>BERLIN, DD,<br>vol. 9, no. 9, 1 January 1974 (1974-01-01)<br>, pages 983-994, XP008108569<br>ISSN: 0023-4753<br>----- | 1-32                  |
| A         | IRVING L.: "The Precipitation of Calcium<br>and Magnesium from Sea Water"<br>JOURNAL OF THE MARINE BIOLOGICAL<br>ASSOCIATION,<br>vol. 14, no. 2, 1926, pages 441-446,<br>XP002538324<br>cited in the application<br>-----   | 1-36                  |
| A         | US 5 240 692 A (MORIFUJI TETSUHIKO [JP])<br>31 August 1993 (1993-08-31)<br>cited in the application<br>-----  | 1-36                  |
| A         | US 6 267 854 B1 (MADDAN ORVILLE LEE [US])<br>31 July 2001 (2001-07-31)<br>cited in the application<br>-----   | 1-36                  |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|----|---------------------|----------------------------|---------------------|
| US 4115219                                | A  | 19-09-1978          | BR 7700564 A               | 06-12-1977          |
|   |    |                     | CA 1083780 A1              | 19-08-1980          |
|   |    |                     | DE 2703203 A1              | 04-08-1977          |
|   |    |                     | ES 455168 A1               | 01-01-1978          |
|   |    |                     | FR 2339572 A1              | 26-08-1977          |
|   |    |                     | GB 1519571 A               | 02-08-1978          |
|   |    |                     | IT 1082504 B               | 21-05-1985          |
|   |    |                     | JP 52094897 A              | 09-08-1977          |
| US 3128248                                | A  | 07-04-1964          | NONE                       |                     |
| US 2006105082                             | A1 | 18-05-2006          | WO 2006055088 A2           | 26-05-2006          |
| US 7261912                                | B2 | 28-08-2007          | US 2006105082 A1           | 18-05-2006          |
|   |    |                     | WO 2006055088 A2           | 26-05-2006          |
| US 5240692                                | A  | 31-08-1993          | JP 4369375 A               | 22-12-1992          |
| US 6267854                                | B1 | 31-07-2001          | AU 1435001 A               | 30-04-2001          |
|   |    |                     | WO 0129287 A1              | 26-04-2001          |