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

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(54) Title: RECOVERY OF PHOSPHOROUS FROM AQUEOUS SOLUTION

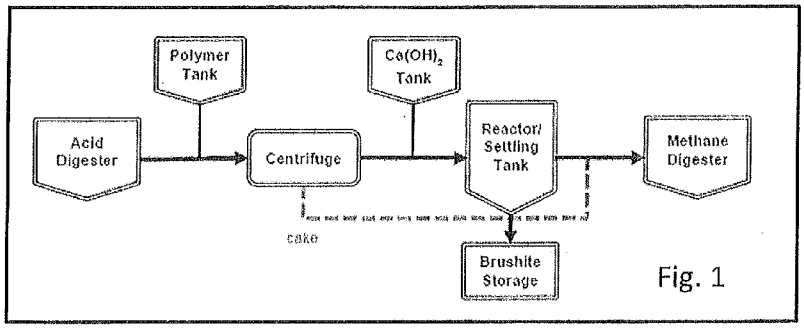

Fig. 1

(57) Abstract: The present invention is in the field of a (semi)continuous improved method for recovery of phosphorous, in particular of phosphorous from a waste stream, and to a product obtained thereby. The product is in a form wherein phosphorous can be released to e.g. the soil and plants at a desired amount per interval of time. The method of recovering phosphorous from an aqueous solution comprising the steps of providing the aqueous solution comprising soluble phosphorous, adding a composition, the composition comprising as mixed ingredients 5-40% CaO (w/w, relative to a total weight of the composition), 10-40% clay mineral, and 20-60% CaC03, wherein 0.5-2 mole CaO/mole soluble P is added, and recovering the phosphorous.

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INTERNATIONAL SEARCH REPORT

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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.:

1-12

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

International application No
PCT/NL2015/050519

A. CLASSIFICATION OF SUBJECT MATTER
INV. C02F1/52
ADD. C02F1/42 C02F11/12 C02F101/10 C02F1/66 C02F3/28
C02F5/06 C02F1/28
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)
C02F B01J C04B

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 511 243 A1 (KARLSRUHER INST TECHNOLOGIE [DE]) 17 October 2012 (2012-10-17) cited in the application paragraphs [0001], [0019], [0020], [0028], [0035], [0039], [0040], [0041], [0043], [0046], [0048], [0056]; figure 1 ----- -/--	1-12

[X] Further documents are listed in the continuation of Box C.

[X] 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	Date of mailing of the international search report
22 October 2015	26/01/2016

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2015/050519

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	CHEN Y-S R ET AL: "Adsorption of phosphate on alumina and kaolinite from dilute aqueous solutions", JOURNAL OF COLLOID AND INTERFACE SCIENCE, ACADEMIC PRESS, NEW YORK, NY, US, vol. 43, no. 2, 1 May 1973 (1973-05-01), pages 421-436, XP024189406, ISSN: 0021-9797, DOI: 10.1016/0021-9797(73)90388-3 [retrieved on 1973-05-01] page 421	1-12
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INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2015/050519

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KAMIYANGO M W ET AL: "Phosphate removal from aqueous solutions using kaolinite obtained from Linthipe, Malawi", PHYSICS AND CHEMISTRY OF THE EARTH, PARTS A/B/C, PERGAMON, AMSTERDAM, NL, vol. 34, no. 13-16, 1 January 2009 (2009-01-01), pages 850-856, XP026563145, ISSN: 1474-7065, DOI: 10.1016/J.PCE.2009.07.012 [retrieved on 2009-07-26] page 850	1-12
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A	JP 2009 285636 A (ONODA CHEM IND CO LTD) 10 December 2009 (2009-12-10) abstract	12

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/NL2015/050519

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-12

   Method for recovering phosphorus from an aqueous solution comprising the steps of adding to the aqueous solution comprising soluble phosphorus 5-40% CaO, 10-40% clay mineral, and 20-60% CaCO3, wherein 0.5-2 mole CaO per mole soluble P is added.

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2. claims: 13, 14

   Product comprising 40-70% brushite, 10-30% calcite, and 1-10% metakaoline.
