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- (72) Inventor; and
(71) Applicant : IANNICELLI, Joseph [US/US]; 28 St. Andrews Drive, Brunswick, GA 31252 (US).
- (74) Agent: DARNELL, Kenneth, E.; 1975 Grimsley Road, Gordon, AL 36343 (US).
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(54) Title: METHODS FOR TREATING WASTE WATERS USING SULFIDIZED RED MUD SORBENTS

(57) Abstract: Sorbents prepared according to the invention useful in remediation of polluted effluents including waste waters and other fluids such as air, the invention is particularly directed to use of sulfidized red muds in treatment of sanitary waste waters to substantially remove or reduce bacterial levels such as fecal coliform as well as phosphates and total dissolved solids (TDS). The sulfidized red mud sorbents of the invention are derived by sulfidation of red mud, a waste product of Bayer processing of bauxite ores, red muds being sulfidized by reaction with sulfidizing agents including H₂S, N_A2S, K₂S, (NH₄)₂S and CaS_X as examples. Sulfidized red muds used according to the invention typically exhibit a sulfur content from about 0.2 to about 10% above residual sulfur in the red mud used as the starting material for preparation of the sulfidized red mud sorbents used in the presently disclosed methods.

INTERNATIONAL SEARCH REPORT

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<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - B01D 15/00 (2012.01) USPC - 96/108 According to International Patent Classification (IPC) or to both national classification and IPC</p>											
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC(8) - B01D 15/00 (2012.01) USPC - 95/92, 116, 133, 134, 900; 96/108, 134, 135; 210/502.1, 663, 679, 681</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatBase, Google Scholar</p>											
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X ----- Y</td> <td>US 2010/0243568 A1 (IANNICELLI) 30 September 2010 (30.09.2010) entire document</td> <td>1-5, 7, 8, 10-14 ----- 6, 9</td> </tr> <tr> <td>Y</td> <td>US 3,120,996 A (PORTER) 11 February 1964 (11.02.1964) entire document</td> <td>6, 9</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X ----- Y	US 2010/0243568 A1 (IANNICELLI) 30 September 2010 (30.09.2010) entire document	1-5, 7, 8, 10-14 ----- 6, 9	Y	US 3,120,996 A (PORTER) 11 February 1964 (11.02.1964) entire document	6, 9
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>											
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="vertical-align: top;"> <p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>							
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<p>Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201</p>		<p>Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>									