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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

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**Declarations under Rule 4.17:**

- *as to the identity of the inventor (Rule 4.17(i))*
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(54) **Title:** A PROCESS FOR SEPARATION AND PURIFICATION OF SODIUM SULFIDE

(57) **Abstract:** The present disclosure provides a method for isolation and purification of sodium sulfide (Na<sub>2</sub>S) formed during desulfurization of petroleum residue. The process involves treating a sludge containing Na<sub>2</sub>S obtained during desulfurization of petroleum residue with a mixture of at least one organic solvent and water.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/IN2012/000263

## A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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: B01D11/-, B09B3/-

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)

WPI;EPODOC;CNPAT;CNKI: desulfurization, sodium sulfide, petroleum, phase, organic, oil phase, aqueous, water phase, NA2S, phase separator, sludge, slurry, pump

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP50012871A(MITSUBISHI HEAVY IND CO LTD) 10 February 1975 (10.02.1975) Claims 1-3; examples 1-4; page 312, paragraph 2; page 313, last paragraph	1-6
A	CN101445458A(YANTAI JULI ISOCYANATE CO LTD) 03 June 2009 (03.06.2009) the whole document	1-6
A	CN101481307A(HUNAN RUIYUAN PETROCHEMICAL CO LTD) 15 July 2009 (15.07.2009) the whole document	1-6
A	CN101391940A(XIAN APP CHEM BIO TECH CO LTD) 25 March 2009 (25.03.2009) the whole document	1-6

Further documents are listed in the continuation of Box C.

See patent family annex.

<p>* Special categories of cited documents:</p> <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>“&amp;”document member of the same patent family</p>
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Date of the actual completion of the international search  
10 December 2012 (10.12.2012)

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# INTERNATIONAL SEARCH REPORT

International application No.

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## A CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both national classification and IPC:

B01D 11/02 (2006.01) i

B09B 3/00 (2006.01) i

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
PCT/IN2012/000263

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
JP50012871A	10.02.1975	JP54003310B	21.02.1979
CN101445458A	03.06.2009	CN101445458B	06.10.2010
CN101481307A	15.07.2009	CN101481307B	02.06.2010
CN101391940A	25.03.2009	CN101391940B	20.07.2011