

Title (en)

METHOD FOR RECOVERING RARE EARTH METALS FROM WASTE SULPHATES

Title (de)

VERFAHREN ZUR RÜCKGEWINNUNG VON SELTENERDMETALLEN AUS SULPHAT-ABFÄLLEN

Title (fr)

PROCÉDÉ POUR LA RÉCUPÉRATION DE MÉTAUX TERRES RARES À PARTIR DE DÉCHETS SULFATES

Publication

EP 3071719 A4 20170809 (EN)

Application

EP 14863833 A 20141121

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- FI 2014050891 W 20141121

Abstract (en)

[origin: WO2015075317A1] The present invention relates to a method for recovering rare earth metals from waste sulphate materials, such as waste gypsum, which is a known secondary resource of rare earth metals and widely present e.g. in areas, where industrial phosphate production takes place. The present invention combines sulphate reduction treatment, such as bioreduction with sulphate reducing bacteria, and magnetic separation, which is based on an exceptionally high magnetic susceptibility of rare earth compounds compared to e.g. calcium compounds in such reductively pretreated gypsum precipitate.

IPC 8 full level

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Citation (search report)

- [YDA] FI 101787 B 19980831 - KEMIRA GROWHOW OY [FI], et al
- [A] RU 2416654 C1 20110420 - ROSSIJSKIE REDKIE METALLY AOZT [RU]
- [A] CN 101597688 A 20091209 - GUIZHOU GUANGDA ENERGY RESOURC [CN]
- [A] US 5034201 A 19910723 - CAILLY FRANCINET [FR], et al
- [A] PL 272533 A2 19890220 - POLITECHNIKA KRAKOWSKA [PL]
- [YA] SATO N ET AL: "A new recycle process of uranium from spent fuel by selective sulfurization", PROCEEDINGS OF SESSIONS AND SYMPOSIA SPONSORED BY THE EXTRACTION AND PROCESSING DIVISION OF THE MINERALS, METALS AND MATERIALS SOCIETY HELD DURING THE 2006 TMS ANNUAL MEETING 2006 MINERALS,, vol. 2006, 12 March 2006 (2006-03-12), pages 973 - 977, XP009194441, ISBN: 978-0-87339-613-4
- [A] KOEN BINNEMANS ET AL: "Recycling of rare earths: a critical review", JOURNAL OF CLEANER PRODUCTION, vol. 51, 1 July 2013 (2013-07-01), pages 1 - 22, XP055109592, ISSN: 0959-6526, DOI: 10.1016/j.jclepro.2012.12.037
- See references of WO 2015075317A1

Cited by

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