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(54) Title: METHODS, MATERIALS AND TECHNIQUES FOR PRECIOUS METAL RECOVERY

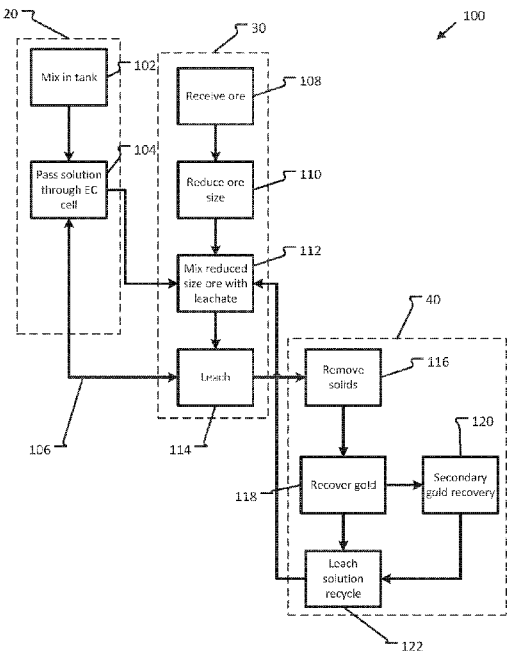


FIG. 2

(57) Abstract: A method for generating an aqueous-based leaching solution for precious metal is disclosed, comprising: combining iodide salt material, carboxylic acid material, and water in an agitated tank, thereby producing a first mixture; passing the first mixture through an electrochemical cell, the electrochemical cell including conductive diamond electrodes; measuring an oxidation reduction potential of the first mixture exiting the electrochemical cell; and continuing to pass the first mixture through the electrochemical cell until the oxidation reduction potential is at least 540 mV SHE. Further, an aqueous-based leaching solution for precious metal is disclosed comprising iodide salt material, chlorite salt material, and carboxylic acid material, the aqueous-based leaching solution being made by a process including the step of: passing a first mixture through an electrochemical cell until a measured oxidation reduction potential (ORP) is at least 540 mV SHE, the first mixture including the above materials and water, the electrochemical cell including conductive diamond electrodes.

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: ***C22B 11/****

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
FAMPAT (Questel), SCOPUS, Google Scholar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	HOJO, M. et al. "Dilute nitric or nitrous acid solution containing halide ions as effective media for pure gold dissolution." Physical Chemistry Chemical Physics 17.30 (2015): 19948-19956	13, 16-20
Y	AYLMORE, M.G., Alternatives to Cyanide for Leaching Gold Ores - Chapter 27, Gold Ore Processing: Project Development and Operations. Mike Adams, Ed., Elsevier, pp. 447-484, 17 May 2016 (17-05-2016)	13, 16-20
Y	WO2011130622A1 (BROSSEAU et al.) 20 October 2011 (20-10-2011)	13, 16-20
A	US4734171A (MURPHY) 29 March 1988 (29-03-1988)	1-12

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

☑ See patent family annex.

*	Special categories of cited documents:
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Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
WO2011130622A1	20 October 2011 (20-10-2011)	WO2011130622A1	20 October 2011 (20-10-2011)
		AP3728A	30 June 2016 (30-06-2016)
		CN102939396A	20 February 2013 (20-02-2013)
		CN102939396B	01 April 2015 (01-04-2015)
		CN104532001A	22 April 2015 (22-04-2015)
		EP2558605A1	20 February 2013 (20-02-2013)
		JP2013524024A	17 June 2013 (17-06-2013)
		JP5792284B2	07 October 2015 (07-10-2015)
		JP2015004135A	08 January 2015 (08-01-2015)
		JP6047132B2	21 December 2016 (21-12-2016)
		JP2017041655A	23 February 2017 (23-02-2017)
		JP6338296B2	06 June 2018 (06-06-2018)
		KR20130052733A	23 May 2013 (23-05-2013)
		KR101620133B1	23 May 2016 (23-05-2016)
		KR20140133964A	20 November 2014 (20-11-2014)
		KR101705417B1	09 February 2017 (09-02-2017)
		KR20150017780A	17 February 2015 (17-02-2015)
		KR101737711B1	18 May 2017 (18-05-2017)
		KR20160054619A	16 May 2016 (16-05-2016)
		KR101749086B1	21 June 2017 (21-06-2017)
		SG184881A1	29 November 2012 (29-11-2012)
		SG10201502960YA	29 June 2015 (29-06-2015)
		TW201144452A	16 December 2011 (16-12-2011)
		TWI558817B	21 November 2016 (21-11-2016)
		TW201634702A	01 October 2016 (01-10-2016)
		TWI568859B	01 February 2017 (01-02-2017)
		TW201634701A	01 October 2016 (01-10-2016)
		TW201634703A	01 October 2016 (01-10-2016)
		US2013276284A1	24 October 2013 (24-10-2013)
		US9215813B2	15 December 2015 (15-12-2015)
		US2016095230A1	31 March 2016 (31-03-2016)
		US10034387B2	24 July 2018 (24-07-2018)
		US2017079146A1	16 March 2017 (16-03-2017)
US4734171A	29 March 1988 (29-03-1988)	US4734171A	29 March 1988 (29-03-1988)
		US4557759A	10 December 1985 (10-12-1985)