



US008118907B2

(12) **United States Patent**
Uhrig et al.

(10) **Patent No.:** **US 8,118,907 B2**
(45) **Date of Patent:** **Feb. 21, 2012**

(54) **METHODS AND SYSTEMS FOR LEACHING A METAL-BEARING ORE FOR THE RECOVERY OF A METAL VALUE**

(75) Inventors: **John Lawrence Uhrig**, Scottsdale, AZ (US); **Gabe Bowman**, Safford, AZ (US); **Cristian Alejandro Caro Matus**, Thatcher, AZ (US); **Percy Mayta**, Thatcher, AZ (US); **Scott Hoenecke**, Thatcher, AZ (US); **Manuel Chavez**, Calama II (PE)

(73) Assignee: **Freeport-McMoran Corporation**, Phoenix, AZ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/545,783**

(22) Filed: **Aug. 21, 2009**

(65) **Prior Publication Data**
US 2010/0058894 A1 Mar. 11, 2010

Related U.S. Application Data
(60) Provisional application No. 61/091,691, filed on Aug. 25, 2008.

(51) **Int. Cl.**
C22B 3/18 (2006.01)
C22B 3/42 (2006.01)
C22B 3/44 (2006.01)

(52) **U.S. Cl.** **75/722; 75/743; 75/770**

(58) **Field of Classification Search** **75/743, 75/770, 722; 205/581; 266/170, 101**

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,127,942 A	7/1992	Brierley et al.	
5,196,052 A	3/1993	Gross et al.	
5,228,900 A	7/1993	Stephens et al.	
5,244,493 A	9/1993	Brierley et al.	
5,246,486 A *	9/1993	Brierley et al.	75/743
5,332,559 A	7/1994	Brierley et al.	
5,688,304 A *	11/1997	Kohr et al.	75/712
5,779,762 A	7/1998	Kohr et al.	
5,873,927 A	2/1999	Schaffner et al.	
6,096,113 A	8/2000	Schaffner et al.	
6,099,615 A	8/2000	Underwood	
6,103,204 A	8/2000	Lizama et al.	
6,110,253 A *	8/2000	Kohr et al.	75/712
6,207,443 B1	3/2001	King	
6,383,458 B1	5/2002	Brierley et al.	

(Continued)

FOREIGN PATENT DOCUMENTS

WO WO 2006/099659 9/2006

(Continued)

OTHER PUBLICATIONS

Brierley, C.L., "Bacterial succession in bioheap leaching," *Hydrometallurgy* 59 (2001) 249-255.

(Continued)

Primary Examiner — George Wyszomierski
Assistant Examiner — Tima M McGuthry Banks
(74) *Attorney, Agent, or Firm* — Snell & Wilmer L.L.P.

(57) **ABSTRACT**

A system and method for recovering a metal value from a metal-bearing ore material are provided. A metal-bearing ore can be mixed with certain substances and to form an agglomerated ore. In an intermediate state, between agglomeration and heap formation, bacteria can be added to the metal-bearing ore material to produce an augmented ore. The augmented ore can then be formed into a heap.

16 Claims, 5 Drawing Sheets

