



US007125436B2

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

(10) **Patent No.:** **US 7,125,436 B2**
(45) **Date of Patent:** ***Oct. 24, 2006**

(54) **METHOD FOR IMPROVING METALS RECOVERY USING HIGH TEMPERATURE PRESSURE LEACHING**

(75) Inventors: **John O. Marsden**, Phoenix, AZ (US); **Robert E. Brewer**, Park City, UT (US); **Joanna M. Robertson**, Thatcher, AZ (US); **David R. Baughman**, Golden, CO (US); **Philip Thompson**, West Valley City, UT (US); **Wayne W. Hazen**, Lakewood, CA (US); **Roland Schmidt**, Golden, CO (US)

(73) Assignee: **Phelps Dodge 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.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/907,324**

(22) Filed: **Mar. 29, 2005**

(65) **Prior Publication Data**

US 2005/0155458 A1 Jul. 21, 2005

Related U.S. Application Data

(63) Continuation of application No. 10/650,167, filed on Aug. 27, 2003, now Pat. No. 6,893,482, which is a continuation of application No. 10/238,088, filed on Sep. 9, 2002, now Pat. No. 6,626,979, which is a continuation of application No. 09/912,967, filed on Jul. 25, 2001, now Pat. No. 6,451,088.

(51) **Int. Cl.**
C22B 15/00 (2006.01)
C22B 11/08 (2006.01)

(52) **U.S. Cl.** **75/724; 75/731; 75/733; 75/736**

(58) **Field of Classification Search** 75/743, 75/718, 720, 726, 738, 733, 115, 748; 423/150, 423/141

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,260,593 A 7/1966 Zimmerley et al.

(Continued)

FOREIGN PATENT DOCUMENTS

AU 0219785 12/1958
CA 2273067 * 11/2000
WO WO 02/08474 1/2002

OTHER PUBLICATIONS

Beckstead, L. W., Acid Ferric Sulfate Leaching . . . , 11 Extractive Metallurgy of Copper 31:611-32, Amer. Inst. of Mining, Metal., and Petroleum Engineers, Inc., 1976.

(Continued)

Primary Examiner—Roy King

Assistant Examiner—Kathleen McNelis

(74) *Attorney, Agent, or Firm*—Snell & Wilmer L.L.P.

(57)

ABSTRACT

The present invention is directed to a system for recovering metal values from metal-bearing materials. During a reactive process, a seeding agent is introduced to provide a nucleation site for the crystallization and/or growth of solid species which otherwise tend to passivate the reactive process or otherwise encapsulate the metal value, thereby reducing the amount of desired metal values partially or completely encapsulated by such material. The seeding agent may be generated in a number of ways, including the recycling of residue or the introduction of foreign substances. Systems embodying aspects of the present invention may be beneficial for recovering a variety of metals such as copper, gold, silver, nickel, cobalt, molybdenum, zinc, rhodium, uranium, rare earth metals, and platinum group metals from any metal-bearing material, such as ores and concentrates.

7 Claims, 2 Drawing Sheets

