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**Datasheet for the decision
of 22 March 2007**

Case Number: T 1260/04 - 3.2.02

Application Number: 01954971.6

Publication Number: 1303642

IPC: C22B 15/00

Language of the proceedings: EN

Title of invention:

Method for recovering copper from sulfide ore materials using high temperature pressure leaching, solvent extraction and electrowinning

Applicant:

Phelps Dodge Corporation

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56, 122

Keyword:

"Admissibility, (yes after re-establishment)"
"Inventive step (yes) after amendments"

Decisions cited:

-

Catchword:

-



Case Number: T 1260/04 - 3.2.02

D E C I S I O N
of the Technical Board of Appeal 3.2.02
of 22 March 2007

Appellant:

Phelps Dodge Corporation
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Phoenix
AZ 85004-3014 (US)

Representative:

Hanna, Peter William Derek
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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 8 June 2004
refusing European application No. 01954971.6
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: T. K. H. Kriner
Members: R. Ries
H. Pignatelli

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division dated 8 June 2004 to refuse European patent application No. 01954971.6.
- II. The application was refused on the grounds that the subject matter of the claims according to the "initial", main and auxiliary requests then on file did not involve an inventive step (Article 56 EPC) having in particular regard to the documents

D1: US-A-5 895 633 and

D2: US-A-5 869 012.

The examining division saw the essential difference between the closest prior art D1 and the application in the dilution ratio which, compared to D1, was much lower in the claimed process before subjecting the copper containing solution to solvent extraction and electrowinning. However, having regard to the problem to be solved by the claimed process, document D2, which also related to a pressure leaching - solvent extraction process was taken into account. This document proposed choosing more concentrated solutions (i.e. to reduce the dilution ratio) to arrive at a more cost-effective solvent extraction process. Hence, the claimed dilution ratio was held obvious in view of the combined teaching of D1 and D2.

- III. On 30 July 2004 the appellant (applicant) lodged an appeal against the decision and paid the prescribed fee on the same day. A statement setting out the grounds of

appeal was filed in electronic form on 7 October 2004. No written confirmation reached the Office within the time limit for filing the statement setting out the grounds of appeal expiring on 18 October 2004.

In a letter dated 27 January 2005 filed in response to the Communication of the Board posted 6 December 2004 informing him that the appeal was considered to be inadmissible, the appellant requested re-establishment of rights under Article 122 EPC. Furthermore, he gave the reasons that lead to the failure to send the confirmation copy in writing of the electronically filed copy of the statement of grounds of appeal, paid the prescribed fee and filed a written copy of the statement setting out the grounds of appeal.

IV. Oral proceedings were held on 22 March 2007. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 6 according to the main (single) request filed during the oral proceedings.

Claim 1 reads as follows:

"1. A copper recovery process comprising the steps of:
(a) providing (200) a copper sulfide-bearing material;
(b) comminuting (202) said copper sulfide-bearing material to provide a comminuted copper sulfide-bearing material in a slurry form;
(c) subjecting said slurry to flotation (208) to separate copper sulfide-bearing materials and to form (210) a concentrated copper sulfide-bearing material;

- (d) pressure leaching (220) said concentrated copper sulfide-bearing material at a temperature in the range of 210 to 235°C in an oxygen-containing atmosphere in a sealed, agitated multiple-compartment pressure leaching vessel to form a product slurry;
- (e) separating (228) said product slurry into a copper-containing solution and a solids-containing residue (280);
- (f) adjusting the pH of said copper-containing solution to a pH of less than 2.2 by chemical adjustment (232) and by combining said copper-containing solution with a make-up diluting solution (250) to yield a pH-adjusted copper containing solution, wherein the ratio of said copper-containing solution to said make-up diluting solution is in the range of 1:4 to 1:8;
- (g) solvent extracting (252) and electrowinning (254) said pH adjusted copper-containing solution to yield a raffinate solution (260) and copper cathode;
- (h) applying said acid-containing raffinate solution in a heap leaching operation (262).

The dependent claims 2 and 6 relate to preferred embodiments of the process set out in claim 1.

V. The appellant's arguments are summarized as follows:

The low dilution ratio of 1:4 to 1:8 featuring in amended claim 1 was clearly distinguished from the disclosure of document D1 according to which a dilution ratio preferably ranging from 1:10 to 1:20, most preferably of 1:20 should be adhered to for providing

optimal conditions for the recovery of copper and other precious metals. Generally, D1 referred to its chosen ratios as "large" or "high rates" of dilution (cf. D1, column 4, line 34; column 6, line 64; column 7, lines 10/11), thus acting as a disincentive for the skilled practitioner to try dilution ratios lower than 1:10. Document D2 was more remote from the claimed process in that it related to a low or medium temperature leaching process in the range of 115 to 160°C and used hydrochloric acid (chloride ions) in the solution, both parameters completely altering the underlying chemistry of the process. Moreover, D2 failed to give any numerical values of the dilution ratio to be aimed at in order to provide optimum process conditions.

Hence, the claimed control of the pH of copper bearing solution prior to solvent extraction by using very low dilution ratios within numerically defined limits in combination with chemical adjustment was taught neither in D1 nor in D2 taken individually, nor derivable from the combined reading of D1 and D2. Any other interpretation of the disclosure of these documents was based on analysis with hindsight.

Reasons for the Decision

1. The appeal is admissible.
- 1.1 The statement setting out the grounds of appeal was filed only in electronic form.

According to Rule 36(5) EPC together with the Notice from the European Patent Office dated 3 December 2003 concerning the electronic filing of documents within the meaning of Rule 36 EPC, point 1 second sentence, published in OJ EPO 2003, 609, electronic filing of documents in appeal proceedings is not permitted (see T 514/05, T 781/04, T 991/04). If a document is filed in an unauthorised way, it shall be deemed not to have been received. Rule 36(5) EPC, second sentence, last half sentence, states this explicitly for documents for which a necessary written confirmation is not supplied and the same must be true *a fortiori* for documents for which only the written form is permitted.

The statement setting out the grounds of appeal shall therefore be deemed not to have been received within the time limit prescribed by Article 108 EPC.

1.2 However, the request for re-establishment of rights is allowable and, therefore, the applicant/appellant has his rights re-established.

1.2.1 The cause of non-compliance was removed through the communication of the Board posted on 6 December 2004, because the appellant noticed at that point for the first time that only the electronic version of the statement setting out the grounds of appeal had reached the office.

Within the two month time limit foreseen by Article 122(2) EPC, a request for re-establishment of rights was filed, reasoned and the fee was paid. The omitted act i.e. the filing of a written statement setting out the grounds of appeal was completed within

this period. The request was filed within the year immediately following the expiry of the unobserved time limit.

The request is therefore admissible.

- 1.2.2 The Board is satisfied that the failure to comply with the time limit, in this case, represents an isolated mistake within a satisfactory system for monitoring time limits.

In fact, the representative submitted in a convincing way that the following practice was normally used in its office and that this practice was usually satisfactory.

In order to ensure a consistent internal electronic record of documents filed and in order to enable reporting to clients by e-mail, an internal decision had been made in the office of the representative of the appellant to send all communications to the EPO in electronic form and to send a confirmation copy via fax or by courier in the cases where a paper copy is still required by the EPO. A firm docketing system exists which ignores the "10-day rule" in application of the principle of due care. This practice is proved by the fact that the notice of appeal, which was filed in electronic form, was indeed confirmed by fax within the time limit provided by Article 108 EPC.

The representative of the appellant made it credible that he was aware of the fact that in appeal proceedings electronic filing is not yet permitted.

This is also demonstrated by the fact that the notice of appeal was confirmed by fax.

The statement setting out the grounds of appeal was filed in electronic form on 7 October 2004. The filing of the written grounds of appeal was docketed for action by the representative in the docketing system before an internal deadline of 8 October 2004. Since the representative was working late, he decided to send the follow up paper copy at a later date, conscious that the time limit would not expire until 18 October 2004. Due to an oversight in the week that followed, the paper copy of the statement setting out the grounds of appeal was not sent by fax as intended.

This is an isolated mistake due to exceptional circumstances in the case.

The request is therefore allowable.

2. *Amendments, Article 123(2) EPC; clarity, Article 84 EPC*

Claim 1 is based on claim 13 as originally filed which has been completed by adding the corresponding reference signs given in the detailed flow diagram of the claimed metal recovery process (Figures 2A and 2B). It further comprises the step of chemically adjusting (232) the pH of the copper containing solution featuring in step (f) of claim 1. The latter amendment has a basis in Figure 2B and is also disclosed in the description, page 9, lines 19 to 23. The relative term "about" has been deleted.

The dependent claims 2 to 6 correspond to claims 14 to 18 as originally filed which likewise include the reference signs given in Figures 2A and 2B and no longer comprise the term "about".

Hence there are no formal objections to the present claims with respect to Article 123(2) and 84 EPC.

3. *Novelty*

Like the application, document D1 is concerned with a process for recovering copper from Cu-sulfides by high-temperature high-pressure oxidation followed by solvent extraction and electrowinning (cf. D1, abstract). The known process comprises the steps of

- (a) providing a copper sulfide containing material (D1, column 2, lines 4 to 7);
- (b) comminuting and
- (c) subjecting the material to flotation (cf. D1, column 4, lines 45 to 57);
- (d) pressure leaching the material at a temperature of about 170 to 230°C in a oxygen containing atmosphere in a sealed multi-compartment autoclave (cf. D1, column 5, lines 14 to 27, 54 to 60)
- (e) subjecting the product slurry to liquid/solid phase separation to form a residue and diluted copper containing solution (cf. D1, column 6, lines 27 to 29);
- (f) adjusting the pH of the slurry in the range of 1.2 to 1.8 by adding a diluent in a ratio of the diluent to the liquid phase of the flashed product slurry ranging from 1:10 to 1:500, preferably to 1:10 to 1:20 (cf. D1, column 6, lines 41 to 63);

- (g) subjecting the copper containing solution to solvent extraction and electrowinning to form cathode copper and a raffinate solution (cf. D1, column 7, lines 17 to 19) and
- (h) applying said acid-containing raffinate solution in a heap leaching operation (cf. D1, column 7 line 51 to column 8, line 27).

It is immediately evident that the essential difference between the claimed process and D1 resides in step (f) which comprises adjusting the pH of the solution by (i) chemical adjustment **and** (ii) by adding a diluent to the solution in a ratio which is restricted to 1:4 to 1:8.

D2 relates to a hydrometallurgical process for the extraction of copper from a sulfide copper ore or concentrate by subjecting the concentrate to low- or medium-pressure oxidation in the presence of oxygen and an acidic halide solution to produce a slurry which is treated by atmospheric leaching at a pH of 1.5 to 2.0 (cf. D2, column 2, lines 53 to 59; column 9, lines 37 to 45). The claimed process differs from D2 by the low- or medium-temperature pressure oxidation conditions (i.e. 115 to 160°C) and the presence of halide ions (preferably chloride) used in the known process. Thus, the chemistry of this process is expected to be different to that of the claimed process.

The process set out in claim 1 is, therefore, novel with respect to the disclosure of documents D1 and D2.

4. *Inventive step*

Starting from document D1 as closest prior art, the problem underlying the present application resides in providing a recovery process which permits the reduction of the capital and operating costs without sacrificing the high extraction yield of copper and other precious or non-precious metals (cf. the application page 3, lines 16 to 29 and lines 27, 28).

The solution to this problem consists in adjusting the pH in a range of less than 2.2 in the product slurry

(i) by significantly reducing the ratio of the diluent to the liquid phase of the flashed product slurry (as described in step (f)) to 1:4 to 1:8, and

(ii) by chemical adjustment of the solution.

Due to the more compact solution, i.e. the relatively low dilution ratio and the chemical adjustment, lower volume of fluids need to be handled within the recovery process which significantly lowers the equipment and operation costs in that there is no need for big cooling towers, storage ponds, multiple extraction units etc.

Document D1 describes a carefully balanced process which permits optimal conditions for the recovery of Cu and other precious metals at high rates. However, document D1 points out in column 6, lines 41 to column 7, line 12 that the metal bearing slurry 54 has to be diluted sufficiently (i) to facilitate the liquid/solid phase separation and (ii) to reduce the acid content (pH) of the diluted copper containing

solution as to provide the desirable equilibrium conditions for the solvent extraction step (g). To this end, the ratio of diluent to the liquid phase of the flashed product slurry should range from 10:1 to 500:1, and preferably from 1:10 to 1:20, the most preferred ratio being 1:20 (cf. D1, claim 1). Several passages in document D1 reflect the need to choose "high" rates of dilution to improve solvent extraction and to permit high recovery rates of precious metals (cf. D1, column 6, lines 31 to 34; column 7, lines 8 to 13), thus prompting the skilled person to select higher ratios within the numerical ranges, i.e. in particular to choose the most preferred ratio of 1:20. Given that the whole teaching of document D1 is pointing towards relatively "high" dilution ratios of about 1:20 rather than to low ratios below 1:10, nothing in this document could motivate the skilled practitioner to operate the process by using a low dilution ratio ranging from 1:4 to 1:8 for the pH adjustment in combination with a chemical adjustment, as set out in claim 1 of the present application.

As previously mentioned, document D2 describes a process of different chemistry which relates primarily to the recovery of Zn in the presence of chloride ions (cf. D2, column 1, lines 49 to 53) and wherein the leaching process is conducted at much lower temperatures (115 to 160°C; cf. D2, column 2, lines 33 to 35) than in the claimed process (210 to 235°C). Although the passage in document D2, column 10, lines 24 to 29 mentions that "more concentrated solutions are, however, cheaper to treat from the capital cost point of view, since the volume is less", this very general statement has to be read and

understood in the context of the low temperature process described. Apart from the absence of any numerical ranges, document D2 does not teach the use of very low dilution ratios **and** at the same time the control of the pH by chemical adjustment, both within narrowly defined limits, as required in the claimed process.

Hence, step (f) of the claimed process could not be rated as being obvious, neither from the technical teaching of document D1 or D2 taken individually nor in combination. The subject matter of claim 1, therefore, involves an inventive step.

The dependent claims 2 to 6 relate to preferred embodiments of the process set out in claim 1 and are, therefore, likewise allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of the first instance with the order to grant a patent on the basis of the following documents:
 - claims 1 to 6 filed during the oral proceedings;
 - drawings Figures 1, 2A and 2B as published;
 - a description to be adapted to the revised claims.

The Registrar:

The Chairman:

V. Commare

T. K. H. Kriner