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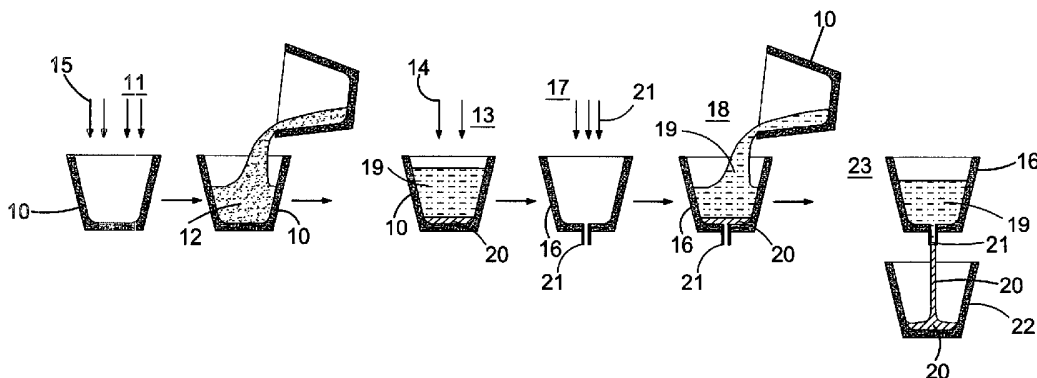
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(54) Title: METHOD OF ORE TREATMENT



(57) Abstract: The invention provides a novel method of treating a mineral sample comprising the steps of: introducing a comminuted mineral sample together with a flux into a reaction vessel, the flux including a collector agent adapted during fusion to collect a constituent of the mineral sample; causing the flux and mineral sample to fuse to form a molten slag and molten collector agent; preheating a separation vessel; introducing the molten slag and molten collector agent into the preheated separation vessel; and separating the molten slag from the molten collector agent.



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METHOD OF ORE TREATMENT

Field of the Invention

5 **THIS** invention relates to a method of treating a mineral sample.

Description of Prior Art

Conventional assaying methods comprise the steps of fusing a mineral sample in a
10 reaction vessel, such as a crucible, and thereafter pouring the molten fused material
into a cast iron vessel which causes solidification of the slag and the metallic prill
which were formed during the fusion process. The metallic prill and slag can then be
separated mechanically for analyses of the prill material.

15 In Applicant's PCT Patent Application No. PCT/ZA01/00092, an assaying method is
disclosed whereby a mineral sample is fused in a fusion vessel, and thereafter
introduced into a separation vessel for separating molten slag from a molten metal
collected during the fusion process.

Object of the Invention

It is an object of the present invention to provide a novel method of treatment of an mineral sample which it is believed will have advantages over the above disclosed
5 methods.

Summary of the Invention

According to the invention, a method treating a mineral sample comprises the steps
10 of:

introducing a comminuted mineral sample together with a flux into a
reaction vessel, the flux including a collector agent adapted during
fusion to collect a constituent of the mineral sample;

15 causing the flux and mineral sample to fuse to form a molten slag and
molten collector agent;

preheating a separation vessel;

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introducing the molten slag and collector agent into the preheated separation vessel; and

separating the molten slag from the collector agent.

5

Further according to the invention, the reaction vessel may also be preheated prior to receiving the mineral sample and the flux.

Also according to the invention, the separation vessel could be such as is disclosed in PCT Patent Application No.PCT/ZA01/00092; and the slag and collector material separated as disclosed in such PCT application.

Brief Description of the Drawings

15 In order more clearly to illustrate the invention an embodiment thereof is described hereunder purely by way of example with reference to the accompanying drawing which is a schematic illustration of an mineral treatment method in accordance with the invention.

Detailed Description of Drawings

With reference to the drawing, a method treating a mineral sample in accordance with the invention comprises the steps of preheating a reaction vessel 10 in an assaying process at a preheating station 11, which could be in the nature of a furnace 15 or the like. Thereafter, the mineral sample 12 in a powdered form together with a suitable flux is introduced into the reaction vessel. The flux will include a suitable collector agent for collecting the mineral which is the subject of the sampling such as gold, platinum or the like. Typically the collector agent could be lead or silver. A suitable fluxes are more fully described in the Applicant's PCT Patent Application No. PCT/ZA01/00092 which is included herein by way of reference.

Thereafter at station 13, the mineral sample and flux is caused to fuse to form a molten liquid by the addition of heat energy 14 if necessary, whereby the metal in question in the mineral sample is collected by the collector agent 20 and a molten slag 19 is formed. The molten collector material 20 being of greater density than the molten slag 19 will settle at the bottom of the reaction vessel 10, as shown.

It is a feature of the invention that the molten material 19, 20, will after fusion be transferred to a preheated separation vessel 16. The separation vessel 16 will preferably be preheated by heat energy 21 at station 17 to a temperature in excess to the melting point of the molten material 19, 20, so that upon such material 19, 20, being transferred to the separation vessel 16, the molten material 19, 20, will not solidify and will separate as a result of differential densities. In the drawing the molten material 19, 20, is transferred to the separation vessel 16 at station 18.

Thereafter, the slag 19 will be separated from the collector agent 20 at station 23 and the latter 20 subjected to further processing. Such separation could be performed in accordance with the disclosure in PCT Patent Application No. PCT/ZA01/00092 as follows:-

An outlet duct 21 is provided at the base of the separation vessel 16 and is adapted in use to drain the collector material 20 from the vessel 16 into a suitable vessel or mould 22, at station 23. The invention provides that the collector agent 20 will be of a greater density and/or a lower viscosity than the molten slag 19 and the proportions of the outlet duct 21 will be such that only the collector material 20 is capable of

flowing through the duct 21. Thus in the case of lead, the lead will readily drain through the outlet duct 21, while the molten slag 19 will be arrested at the outlet duct 21 and be incapable of passing therethrough as a result of the lower density and viscosity thereof, as shown at station 23. It has been found that an outlet duct 21 of

5 generally circular cross-section with a diameter of between 0.5mm and 2.0mm preferably around 1.0mm, will be suitable. It will be appreciated that the size of the aperture could be rendered adjustable to suit requirements, for example by providing a suitable valve, not shown, or stopper for such outlet duct 21.

10 Doubtless variations in detail of the above described invention will be possible without departing from the principles set out in the appended claims.

Claims

1. A method of treating a mineral sample comprising the steps of :
 - 5 introducing a comminuted mineral sample together with a flux into a reaction vessel, the flux including a collector agent adapted upon fusion to collect a constituent of the mineral sample;
 - causing the flux and mineral sample to fuse to form a molten slag and
 - 10 molten collector agent;
 - preheating a separation vessel;
 - introducing the molten slag and molten collector agent into the
 - 15 preheated separation vessel; and
 - separating the molten slag from the molten collector agent.

2. The method according to claim 1 wherein the reaction vessel is preheated prior to the introduction of the molten slag and collector agent into the reaction vessel.
- 5 3. The method according to claim 1 or claim 2 wherein the reaction vessel is preheated to a temperature above the temperature of the molten slag and molten collector material.
- 10 4. The method according to any one of claims 1 to 3 wherein the collector agent is separated from the slag by allowing the collector agent to drain through an outlet aperture by force of gravity, the dimensions of the aperture being sufficiently restricted to prevent the molten slag from draining through the aperture by force of gravity.
- 15 5. A method of treating a mineral sample substantially as herein described with reference to the accompanying drawings.

