

## TECHNOLOGY OFFER

# CHEMISTRY UND BIOTECHNOLOGY

We protect and  
market inventions.

## PHYSICAL SEPARATION OF GOLD

Dielectrophoretic separation of metal particles from mixtures of particles (UN 467)

### THE PROBLEM

At present, cyanide leaching is the method which is being most often applied to extract gold from ores. On average, 150 tons of cyanide are needed for each ton of gold. It is estimated that 182,000 tons of cyanide are used worldwide each year which, despite subsequent treatment, are often released into the environment without restraint.

Apart from the high environmental impact the costs for the procedure are immense: 300,000 euros per ton gold are attributable to the cyanide; in addition, there are other chemicals as well as the costs for maintaining environmental specifications. Costs ranging from 500,000 to 1,000,000 euros per ton of gold are incurred this way.

### THE SOLUTION

The present invention relates to a plant and a procedure for separating gold or other metal particles from a mixture of particles by applying dielectrophoresis. The physical separation method specifically separates metals, e.g. gold, from a suspension. This is accomplished by a special configuration of electrodes allowing for the creation of an electric field which is selective to metallic particles.

The new method replaces environmentally hazardous cyanide leaching almost completely and thus considerably reduces the amounts of the chemicals that need to be applied. Depending on the given environmental specifications, cost savings amount to at least 500,000 euros per each ton of gold. This stands in contrast to investment costs of approx. 20 million euros per mine. Depending on the output and the gold content, an amortization period of about five years may be expected.

The method is also suited for the extraction of other metals or for recycling metals from material mixtures, for example, electronic waste materials.

The feasibility of the method has already been demonstrated in the laboratory. As the components of the plant are essentially all available on the market, a demonstration plant can be built in the short term. The dimensions of the plant and thus its throughput rate can be almost freely selected by applying a numbering-up process.

### ADVANTAGES AND APPLICATIONS

- Saving of considerable amounts of chemicals contaminating the environment.
- Reduction of processing costs including costs to satisfy environmental obligations by about 50 %.
- Better workplace conditions by restricting methods hazardous to human health.
- Economically exploitable amounts of gold can also be obtained from the material of previous excavations.

The result of a market analysis shows that physical gold separation elicits great interest especially in states that impose high standards to guarantee environmental safety. The market potential of the invention will additionally increase because of worldwide increasing environmental obligations.

### FIELD OF APPLICATION

Gold extraction, metal recycling, electronic scrap recycling, precious metal recovery

### KEYWORDS

precious metals, separation methods, reducing methods having environmental impacts, recycling

### PROPERTY RIGHTS

DE10 2013 011 72 32  
registered  
W02015/007270A1

### OFFER

Licensing, sales, cooperation and further development

### AN INVENTION OF

University Bremen,  
UFT – Center for Environmental Research  
and Sustainable Technologies



InnoWi GmbH  
Fahrenheitstraße 1  
28359 Bremen  
Tel.: 0421- 96 00 7 - 0  
mail@innowi.de  
www.innowi.de