

Methods for extracting metals from optical fiber communication cables



AI Overview

Metals, especially germanium, can be efficiently recovered from optical fiber cables using a combination of mechanical pre-treatment, pyro- and hydrometallurgical processes, solvent extraction, ion exchange, and distillation techniques.

Mechanical Pre-Treatment The first step in metal recovery involves removing the plastic and other non-metallic components from the cables. This is typically done using wire and cable strippers or multifunction machines, which strip the outer polymer layers efficiently and prepare the fibers for further processing. Additional steps may include cutting, crushing, grinding, and particle selection to separate metals from polyethylene and other materials.

Pyrometallurgical Methods Pyrometallurgy involves high-temperature treatment of fiber scraps to recover metals. This method is commonly used for germanium recovery from coal and fiber scraps. It is effective but can result in high energy consumption and impurity content in the recovered metal. Reductive roasting is a specific pyrometallurgical technique where fibers are heated with reducing agents to convert germanium compounds into recoverable forms.

Hydrometallurgical Methods Hydrometallurgy is often preferred for optical fiber recycling due to its higher purity and efficiency. The process typically includes:

- Solvent treatment:** Fibers are treated with solvents like acetone or ethanol to separate glass from plastics.
- Roasting with additives:** Sodium hydroxide (NaOH) is used to convert the fiber glass into silicates at elevated temperatures, facilitating metal leaching.
- Leaching:** Dilute acids, such as H₂SO₄, are used to dissolve germanium, achieving leaching rates above 99%.
- Chemical precipitation and hydrolysis:** These steps recover germanium from the leachate.
- Ion exchange and solvent extraction:** These techniques further purify germanium from other dissolved elements.
- Distillation:** Germanium chloride can be...

Article Content

Recovery of germanium from waste Optical Fibers by ...

Request PDF | Recovery of germanium from waste Optical Fibers by hydrometallurgical method | With the rapid development of optical fiber communications industry, germanium as main

Recovery of germanium from waste Optical Fibers by

With the rapid development of optical fiber communications industry, germanium as main raw materials of optical fiber cables become more important in recent years. Due to the scarcity and

Recovery of germanium from waste Optical Fibers by

Due to the scarcity and importance of germanium, we developing an effective recycling process of recovering germanium metal from waste fiber optic cables. The process was arranged to

Germanium from Fiber Scraps

The chlorides of these elements are easily separated via distillation and can be further purified for the production of new fiber-optic cables. Parallel to the pyro

Valuable Metals Recovery from Fiber Optics Cable

This research will study an efficient method for extracting germanium from waste fiber optics cables. Germanium is widely used in optical fibers, infrared optics, and solar energy industry. Optical fiber is

Recovery of germanium from waste optical fibres using

Germanium is the raw metal of the optical fibers which become more important with the rapid development of optical communication in recent years.

Extracting Pure Gold From Electrical Trash Just Got Easier

Using fibers, researchers can extract nearly 100 percent of gold from electronic waste, much more than previous methods.

Improve subsequent leaching efficiency and extraction rate

Due to the rarity of germanium, developing an effective recycling process of recovering germanium metal from waste fibre optical cables is significant. Fibre optical cables was arranged to do

Open Access proceedings Journal of Physics: Conference series

Germanium as the scarce metals, the future resources will face a shortage of supply. Therefore, the disposal of these discarded optical fiber cables is necessary, and because of the limited resources of

(PDF) Optical fiber tapping: Methods and precautions

Optical fiber communication is not as secure as generally perceived. There are a number of known methods of extracting or injecting information into

Recovering Germanium from waste optical fiber cables

In this study, we are engaged in developing an effective recycling processes of recovering germanium metal from waste fiber optic cable.

Optical Fibers to Detect Heavy Metals in Environment

The material sensitive to the heavy metals are directly deposited over the fiber tip or in a substrate that will be illuminated by an optical fiber. The

Optical Fibers to Detect Heavy Metals in Environment: Generalities

1. Introduction The fiber optic sensors can be used to create a truly distributed chemical sensing capability for selectively detecting metal compounds by spatial and temporal acquisition over large

(PDF) The Vulnerability of Fiber

When used nefariously, optical taps provide an excellent method of intercepting voice and data communications with virtually no chance of being

KR101919997B1

Abstract Disclosed is a method to collect germanium from optical fiber, capable of efficiently collecting germanium from optical fiber of a waste optical cable.

Recovery of germanium from waste optical fibres using phosphonium

The developed methodology provides an eco-friendly, efficient as well as selective approach and gives a suitable solution to the limitations of previous techniques such as

Survey of diverse hydrometallurgy techniques for recovering and ...

For recycling waste PCBs, efficient and eco-friendly techniques are needed in the direction to create the method more efficient and eco-friendly., The aim of the present review, the

Fiber optic vs metal components

Both metal and fiber optic cables can be durable options as both can be designed to meet IP (Ingress Protection) ratings up to IP67. For consistency, fiber optics may be the suitable choice as

Erbium in Fiber Optics: The Rare Metal Powering High-Speed Internet

Discover how erbium, a rare metal, powers high-speed fiber optic networks and revolutionizes global communication. Learn about its vital role in signal amplification, its impact on

Fiber Optics

This video show how ceramic ferrules can be extracted from fiber optic cables. Ceramic ferrules are made of a hard ceramic material and have a very small precision bore of 125 microns in the center.

Recycling rare earth metals from luminescent fibers by solvent ...

An optimization of the separation method for extracting the metals of interest (Er, Y, La, Gd, Yb, Ho, Tm, Tb, and Eu) was carried out by assessing selective extractants (di-(2-ethylhexyl)

Open Access proceedings Journal of Physics: Conference series

This study proposes a hydrometallurgical method that can effectively improve the subsequent leaching efficiency and extraction success rate of germanium in optical fibre cables with pre-treatment.

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.sphplantsales.co.za>

Email: info@sphplantsales.co.za

Phone: +27 64 827 3915

Address: Unit 9, Highveld Technopark, 43 Atlas Road, Johannesburg, 2196, South Africa

This document is for informational purposes only. Specifications subject to change without notice.

