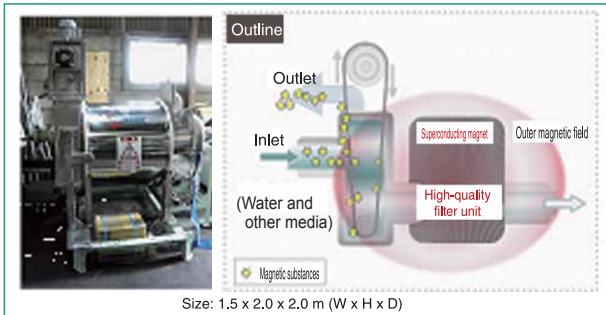


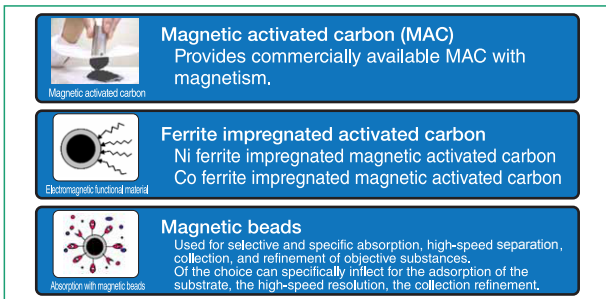
Superconducting Magnetic Separator, technology for imparting magnetic properties

Features

- Recover valuables and metals in wastewater and effluent.
- Remove pollutants (heavy metals, fluorine, boron, oils, etc.) from water and soil.
- The compact 6-m² equipment provides high-volume treatment at a rate of 20 tons of water per hour.



Superconducting Magnetic Separator



Magnetic adsorbents (Magnetic absorption agents and magnetic porous solids)

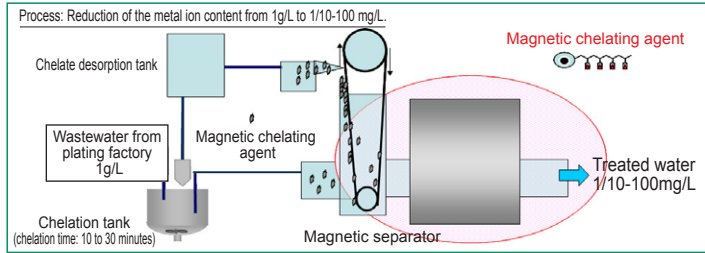
Overview

(Technical principles, actions, etc.)

Superconducting magnetic separation is basically a technology for separating magnetic and nonmagnetic substances. However, additional technologies, including a technology to provide non-magnetic substances in wastewater, such as suspended solids (SS), with magnetic properties, or one leveraging magnetic adsorbent to collect substances dissolved in the sludge and water, have been developed. Magnetic metals are caught in the strong magnetic field of a superconducting magnet. Nonmagnetic SS are coagulated with magnetic particles into flocs to provide them with magnetic properties, while substances dissolved in wastewater are processed using magnetic particle adsorbents, such as magnetic activated carbon, to be separated magnetically. Magnetic separators that continuously extract materials collected in the powerful magnetic field without disturbing the other magnetic fields have also been developed.

Applications include:

- Removal of SS from factory wastewater, recycling of wastewater (2001 NEDO Support Project)
- Removal of hazardous substances (boron, arsenic) and heavy metals from wastewater.
- Removal of arsenic from slurry using functional iron particles (joint venture)
- Removal of radioactive cesium from incinerator fly ash using magnetic Prussian blue adsorbent (joint venture)
- Refinement of proteins and enzymes (joint venture)
- Recovery of valuable metals (nickel, phosphorus) from plating industry wastewater (joint venture)
- Concentration of dissolved metals in the refining process of rare metals and other ocean floor resources (new project)



Flow for recovering valuable metals from plating wastewater



Separation/removal of arsenic from the sludge using functional iron particles.

Introductory Track Record

- Presently, the equipment has only been delivered in Japan.

Effects

- ⊙ Magnetic separation utilizes the physical magnetic properties and imparts a magnetic force on the target objects for high-speed separation. Compared with other conventional separation methods, the separation speed of magnetic separation is much higher by the superconducting magnet that creates stronger magnetic field and the high gradient magnetic filter. Such features also helped reduce the size of the equipment.
- ⊙ The technology of magnetizing target objects allows the separation of magnetic objects from non-magnetic objects regardless of their size or weight, which could be similar. It can also be applied to substances that have been difficult to separate.
- ⊙ The magnetic adsorbent particles, including activated carbon involving adsorption into micropores and chelate adsorbents, are promising materials for application in a wide variety of fields. Antigen-antibody reaction using affinity magnetic beads may also be combined with magnetic separation.
- ⊙ Magnetic adsorbent particles have a large specific surface area and good adsorption-speed/selectivity characteristics. Magnetic separation is the best choice for separating particles efficiently and processing a large amount of water or other media using a compact system.

Applicable field
Recovery of metals from plating industry wastewater, refining separation/concentration in the resources mining business, environmental recovery at sites with ground contamination by heavy metals, etc.

Water

Energy saving/Energy recovery

Energy storage/Energy creation

New energy

Waste disposal/
Recycling/
Resource saving

Air

Soil

Other

ENERGY

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