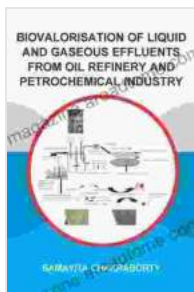


Unlocking the Potential of Oil Refinery Effluents: Biovalorisation and Sustainable Solutions

The oil and gas industry is a vital part of the global economy, but it also faces significant environmental challenges. One of the major issues is the management of liquid and gaseous effluents generated during the refining process. These effluents contain a variety of pollutants, including hydrocarbons, organic matter, and heavy metals, which can have harmful effects on the environment and human health if not properly treated.



Biovalorisation of Liquid and Gaseous Effluents of Oil Refinery and Petrochemical Industry (IHE Delft PhD Thesis Series) by Nicola Sly

4 out of 5

★ ★ ★ ★ ☆ 4 out of 5

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Print length : 200 pages



Biovalorisation is a promising approach to address this challenge. It involves the use of biological processes to convert these waste streams into valuable products, such as biogas, biofertilizers, and bioplastics. This not only helps to reduce the environmental impact of oil refining, but it also creates new revenue streams for the industry.

Liquid Effluents

Liquid effluents from oil refineries are typically treated using a combination of physical, chemical, and biological processes. Physical processes, such as settling and filtration, remove solids and suspended particles from the wastewater. Chemical processes, such as coagulation and flocculation, destabilize pollutants and cause them to form larger particles that can be removed by sedimentation or filtration.

Biological processes, such as activated sludge and anaerobic digestion, use microorganisms to break down organic matter in the wastewater. Activated sludge is a process in which the wastewater is aerated to encourage the growth of aerobic bacteria, which consume the organic matter. Anaerobic digestion is a process in which the wastewater is digested by anaerobic bacteria, which break down the organic matter in the absence of oxygen. Both of these processes can produce biogas, which can be used as a renewable energy source.

Gaseous Effluents

Gaseous effluents from oil refineries are typically treated using a combination of flares and scrubbers. Flares burn the gaseous effluents, which destroys the pollutants. Scrubbers use a liquid to remove the pollutants from the gases. The liquid is then treated to remove the pollutants before it is discharged to the environment.

There are a number of innovative technologies that are being developed to improve the treatment of both liquid and gaseous effluents from oil refineries. These technologies include:

- Membrane bioreactors (MBRs) are a type of activated sludge process that uses a membrane to separate the treated wastewater from the

activated sludge. This allows the activated sludge to be retained in the reactor, which improves the efficiency of the process.

- Upflow anaerobic sludge blanket (UASB) reactors are a type of anaerobic digestion process that uses a blanket of sludge to filter the wastewater. This improves the contact between the wastewater and the anaerobic bacteria, which increases the efficiency of the process.
- Biotrickling filters are a type of scrubber that uses a bed of microorganisms to remove pollutants from the gases. The microorganisms consume the pollutants, which are then discharged to the environment as harmless byproducts.

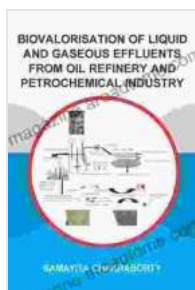
Benefits of Biovalorisation

The biovalorisation of liquid and gaseous effluents from oil refineries offers a number of benefits, including:

- **Reduced environmental impact:** Biovalorisation processes can remove a variety of pollutants from oil refinery effluents, which helps to protect the environment and human health.
- **Improved energy efficiency:** Biogas produced from anaerobic digestion can be used as a renewable energy source, which can help to reduce the operating costs of oil refineries.
- **New revenue streams:** The products generated from biovalorisation processes, such as biofertilizers and bioplastics, can be sold to generate additional revenue for oil refineries.

Biovalorisation is a promising approach to address the challenge of managing liquid and gaseous effluents from oil refineries. This innovative

field offers a number of benefits, including reduced environmental impact, improved energy efficiency, and new revenue streams. As the technologies continue to develop, biovalorisation is expected to play an increasingly important role in the sustainable development of the oil and gas industry.



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