

Scavenging Case Study

Replacement of Hydrazine Footing with Smopex

Introduction

Emission Control Technologies produce a number of precious metal salts used in the manufacture of autocatalyst washcoats at their manufacturing plant in Germiston, South Africa.

During the manufacture of one of these compounds, hexahydroxy platinic acid, an effluent is generated that contains residual levels of platinum.

One chemical method recovery of the platinum is by chemical reduction with hydrazine, a particularly effective but toxic chemical. Although effective at recovering platinum from solution, hydrazine presents a number of health and safety issues regarding its preparation, handling and storage.

Smopex, a metal scavenger supplied by Johnson Matthey Scavenging Technologies, was evaluated as a safe, effective and viable replacement for hydrazine for the recovery of platinum from the HHPA effluent at the Germiston plant.

Hydrazine is highly toxic chemical. It is harmful by inhalation, if swallowed and by contact with skin. It is dangerously unstable, especially in the anhydrous form. Therefore, it is handled as a solution when used as a reducing agent.

Hydrazine can decompose violently with metals or their oxides potentially causing ignition of the evolved hydrogen. If the solution is splashed onto clothing or cleaning cloths and allowed to dry out, it becomes a fire hazard, liable to spontaneous ignition.

Due to these dangers, hydrazine solution must be introduced to the footing tanks using a purpose built hydrazine cupboard and dispensing system to minimise exposure. The Occupational Safety and Health Administration (OSHA) limits the amount of hydrazine in workplace air to 1 ppm for an 8-hour workday.

The target was find a viable, safe alternative treatment to hydrazine for the recovery of platinum from the HHPA effluent.

The Problem

Industry:

Chemical manufacturing

Company:

Johnson Matthey Emission Control Technologies

Location:

Germiston, South Africa

Process:

Recovery of platinum from the manufacture of hexahydroxy platinic acid

Key driver:

Replacement of toxic chemical (hydrazine)

Technical highlights:

- Significant health & safety improvement due to elimination of a toxic substance
- 100% platinum recovery using Smopex

Key outcome:

Smopex was confirmed as successful, and has since been the permanent treatment route for platinum recovery at the Germiston plant

Results

Screening trials performed at our labs at Royston UK showed that Smopex 105 was able to recover 99% of the platinum from the samples provided.

Germiston plant trials at a scale of 500-1000L resulted in a platinum recovery of 100%. Trials were scaled up to production volume batches of 4000-6000L successfully.

Technical support from Scavenging Technologies was continuously available to the Germiston plant engineers and chemists during trials.

Current status

After several plant trials using Smopex in place of hydrazine the evaluation and processing of Smopex was confirmed as successful and as has since been the permanent treatment route for platinum recovery at Germiston.

Why Smopex?

Smopex offers many benefits over hydrazine including:

- Safe and easy to use chemical alternative
- No environmental, health or safety issues
- Faster, cleaner metal recovery route
- Reduction of manual handling
- Improved metal turn around times

Conclusion

The process used at ECT Germiston has proven that Smopex is a credible and viable alternative to hydrazine footing and has shown many benefits within the recovery of platinum process. These include much improved health and safety issues due to the replacement of hydrazine, reductions in manual handling and improved process economics due to quicker metal turn around times.



Smopex 105 fibres

For additional scavenging case studies and information on our products, please visit:
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