SAMSUNG AUSTIN SEMICONDUCTOR IMPROVES SAFETY AND QUALITY OF MEASUREMENTS FOR COPPER WASTEWATER STREAMS WITH METALGUARD™ ANALYZER

The semiconductor industry has found that traditional analytical methods for complexed copper in wastewater are not fit for purpose. Complexed copper cannot be measured using ion-selective electrodes and colorimetry technology faces a number of severe challenges.

Although colorimetry using bicinchoninic acid assay can accurately analyze complexed copper found within industrial wastewater streams, the technology is plagued with issues including overall safety, quality of analysis, and reliability (uptime of the system).

Safety is a prevalent concern because the Bicinchoninate Method calls for the use of a bicin solution containing ammonium hydroxide, which requires a fume hood and tightly sealed containers for safe handling. Colorimetry systems often have more than 40 potential failure points, which negatively impacts analyzer uptime and drives a substantial maintenance burden and associated costs. With colorimetry systems, the cost of ownership is further increased as sample times are reduced (i.e. 45 minutes to 30 minutes) when using colorimetry systems. Lastly, the precursors used to create bicin solutions experienced a worldwide shortage in 2017, impacting end-users of colorimetry technology for copper wastewater analysis.

Faced with the challenges of colorimetry, Samsung Austin Semiconductors (SAS) evaluated an alternative analytical method for complexed copper in wastewater based on Direct Voltammetry. Aqua Metrology Systems' (AMS) online MetalGuard™ analyzer was evaluated for its potential to significantly improve safety and quality of measurements for copper wastewater streams. Findings from two 90-day tests will be presented at the Ultrapure Micro 2018 conference in Austin, Texas on June 1, 2018, during the Water Management WM Session 5 at 2:00 pm.

The electroanalytical method of Direct Voltammetry is a concept that is well suited to provide unattended automated trace metal analysis field units. It has outstanding sensitivity and allows for speciation of multivalent metal ions without requiring additional sample preparation.

MetalGuard™, a newly developed voltammetric detector, has exhibited a high sensitivity to copper species coupled with a robust and stable design. This analytical approach employs a sensor self-generation mechanism making the probe (Meniscus electrode) less susceptible to gradual contamination from impurities or byproducts from the electrochemical process.

As a result, the instrument is capable of maintaining its sensitivity (0.05 ppm) and calibrated status for an unlimited timeframe while operating reliably regardless of sample matrix conditions. The system is fully automated and the typical measurement time is 20-30 minutes. Since the instrument measures two distinct waste streams within a single unit, SAS was able to reduce the total number of analyzers on site from four to two. SAS also realized additional cost reductions because of MetalGuard's low reagent and consumable use. Further operational savings at SAS resulted from this novel analyzer's automation and self-calibration. And most importantly, the MetalGuard technology supported the industrial wastewater treatment vision at SAS; safely treat and dispose of waste with quality standards that encompass the most environmental, economic, and adaptable methods.

Semiconductor facilities and other industrial users struggling to find a safe, reliable and effective way to measure complexed copper in wastewater will benefit from evaluating the MetalGuard analyzer for their analytical needs.

Aqua Metrology Systems
1225 E. Arques Avenue
Sunnyvale, CA 94085
United States
www.aquametrologysystems.com

CONTACT
Rick Bacon
+1 617 543 6522
rbacon@aquametrologysystems.com

aqua metrology systems