TECH OFFER

Low-Cost and High-Resolution Chemical Analysers

KEY INFORMATION

TECHNOLOGY CATEGORY:
Chemicals - Analysis
Electronics - Sensors & Instrumentation

TECHNOLOGY READINESS LEVEL (TRL): TRL8
COUNTRY: SINGAPORE
ID NUMBER: TO174935

OVERVIEW

Chemical analysers determine the chemical composition and characteristics of compounds. Such devices aim to provide rapid and accurate results of the analysed compounds but are often limited to bulky, laboratory-grade designs. Traditional spectroscopic systems are limited by its detection range based on the monochromator and light source, often resulting in poor resolution that affects the results of the analysis.

This technology on offer is a patented low-cost, high signal-to-noise ratio micro-spectrometer module that can be used in long-distance detection. In comparison to traditional spectrometers that use spectral splitting, the utilisation of frequency-varying incident light to measure different spectral bands without signal intensity loss enables the user to achieve high signal-to-noise ratios and high precision. By using this spectrometer, real-time analysis of the composition of chemicals at the point of manufacture is possible which makes it a convenient tool for quality checks to enhance product quality and reduce risks.

The technology has been validated for use in semiconductor manufacturing and the technology owner is interested in co-

development projects and test-bedding opportunities to extend the technology in other sectors such as specialty chemicals, pharmaceutical, smart home appliances, food and agriculture to name a few.

TECHNOLOGY FEATURES & SPECIFICATIONS

This technology is a micro-spectrometer comprising of a composition analyser and optical detection components (semiconductor light sources and sensors) with the following features:

- Low-cost and modular device
- Self-developed architecture module
- High precision and signal-to-noise ratio
- Able to penetrate glass and perform component analysis in different spaces over long distances
- Suitable for analysis of organic compounds that can be detected from 250 to 2500nm

POTENTIAL APPLICATIONS

Potential applications of the micro-spectrometer include (but are not limited to):

- Inspection of industrial products for process monitoring, real-time picking and inspection and product classification
- Smart devices for health management and home appliances
- Biomedical – for use in medical devices

MARKET TRENDS & OPPORTUNITIES

The global process analysis equipment production is valued at $6.7 billion in 2022, with a compound annual growth rate of approximately 6.55%. This market is projected to grow to $8.1 billion in 2025.

With this technology, users can utilise this small, accurate and low-cost device to maximise production outputs.

UNIQUE VALUE PROPOSITION

- Low-cost device with good spectroscopic performance (high signal-to-noise ratio)
- Enhanced applicability of spectroscopic analysis – able to measure through thick glass or conduct long-distance measurements

The technology has been validated for use in semiconductor manufacturing and the technology owner is interested in co-development projects and test-bedding opportunities to extend the technology in other sectors such as specialty chemicals, pharmaceutical, smart home appliances, food and agriculture to name a few.