

# **MERCURY DETECTION AT POINT-OF-CHECK USING PLASMONIC NANOPARTICLE PATENT NO. PI2018000598**

This innovation was developed to ensure fast screening and monitoring of mercury (II) ion in water sources without the need to bring the water samples to the lab. Thus, this innovation would be very helpful to the environmentalist and government officer to do the monitoring and analysis of mercury (II) ion.

Hg

## 1. Concept



## 2. Characterization









## Breaking the Wall of Sophisticated **Pollution Detection**



Sri Haneco

# **ADVANTAGES**

- Cost effective. Each water samples only cost RM4.
- Rapid and efficient. Each samples will require 10 minutes to complete.
- Internet friendly. As the color changes of the sample can be detected using smartphone app, the data can be stored using cloud and can be accessed easily.
- The system also has high sensitivity which can detect mercury (II) ion up to 0.5ppm level.
- It is also selective towards mercury (II) ion.
- The innovation can be applied for in-situ monitoring which is important in environmental monitoring.
- Pretreatment for water sample is also not required

### **TRL 5-Validation in real environment**



**Project Leader Team members Dept./Faculty** Email Phone Expertise

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# INVENTION

Several detection techniques have been developed and commercially available to detect mercury in water sources including atomic absorption spectrometry (AAS), Synchroton X-ray fluorescence spectrometry (SXRF), microwave plasma atomic emission spectroscopy (MP-AES), inductively coupled plasma mass spectrometry (ICP-MS), cold vapor atomic fluorescence spectrometry (CVASF) and thermal decomposition mercury analyser (TDMA).

Although these techniques provide sensitive and accurate result in determining the level of heavy metal in the environment, however, these techniques require expensive instruments, sophisticated method and time-consuming procedure which make them less mobile and certainly non-practical to be used as in-situ analytical tools for frequent monitoring.

Colorimetric assay of mercury (II) ion using cysteine functionalized gold nanoparticles is a good technique that can provide rapid and efficient for in-situ monitoring of mercury (II) ion as the plasmonic resonance of gold nanoparticles can determine the presence of mercury (II) ion in water sources. The mercury (II) ion detection only takes about 10 minutes to complete.

And this technique comes with a smartphone-attached fabricated chamber where it can be connected to the smartphone app that can act as absorbance reader to distinguish the color produced by the system.

## MARKET POTENTIAL

- Department of Environment
- Ministry of Energy, Science, Technology, Environment, and Climate Change of Malaysia.
- Water pollution related industries
- STEM kit for school children





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