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MOLECULAR FLUORESCENCE SENSOR FOR MERCURY DETECTION

HARDWARE, CIRCUITS, & SENSORS

Fluorescent molecule and quantification system for low cost, point-of-use, rapid, portable, and highly selective detection of mercury in water.

TECHNOLOGY TYPE

Chemical Sensors

STAGE OF DEVELOPMENT

- Prototype validated for mercury testing.

- Ongoing work to add functionality for other heavy metals including cadmium, copper, and lead.

IP PROTECTION

U.S. Utility Patent Issued

Molecular Fluorescence
Sensor for Highly Sensitive
and Selective Detection of
Mercury
US8058075B2

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Reference Number: U-4559

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TECHNOLOGY SUMMARY

Mercury pollution causes hazardous environmental and health issues, such as heart, kidney, stomach, and gene damage. The EPA's Safe Drinking Water Act set maximum mercury contaminant levels at 2 ppb. Most mercury detection sensors are colorimetric and fail to quantify mercury levels. Additionally, interference from coexisting metal ions often result in false positives.

University of Utah researchers have invented a low cost, point-of-use optical sensor for mercury detection and quantification in water. The new sensor exhibits sensitive and selective detection of mercury directly in aqueous solutions through fluorescence quenching. The fluorescent molecule dims in the presence of mercury to enable detection at low levels. Companion software that uses optical detection of the fluorescing molecule quantifies the mercury concentration and enables rapid, portable mercury detection. The sensor exhibits high stability and offers superior detection performance compared to traditional molecular fluorescence sensors.

FEATURES AND BENEFITS

- Reduces interference from coexisting metal ions to improve selectivity.
- Enables mercury detection as low as 1 ppb, less than EPA requirements.
- Facilitates affordable, real-time measurement of mercury in environmental water samples.

RECENT PUBLICATIONS

Han, A., Liu, X., Prestwich, G.D., Zang, L. (2014). Fluorescent sensor for Hg²⁺ detection in aqueous solution. *Sensors and Actuators B: Chemical*. 198: 274-277. doi: [10.1016/j.snb.2014.03.033](https://doi.org/10.1016/j.snb.2014.03.033)

INVENTOR PROFILE

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