

**Battelle Number(s):**

15690-E

Available for licensing in all fields

Available Technologies

# Portable Electrochemical Sensing System

## SUMMARY

Researchers at Pacific Northwest National Laboratory have developed an inexpensive electrochemical sensing system that significantly improves the ability to rapidly and accurately detect heavy metals in biological and environmental samples.

Using a simple blood sample from a finger prick, the system identifies and eliminates exposure to the toxic metals, such as lead, these dangerous elements continue to pose a significant health concern, especially to children.

The portable analyzer system has been optimized to reliably detect lead and other toxic metals in urine, blood and saliva as accurately as current state-of-the-art plasma, mass spectrometry systems. The device can use either a flow injection system with a mercury-film electrode or a mercury-free system involving the use of functionalized nanomaterials developed at PNNL to provide excellent detection sensitivity at a parts-per-billion level.

## ADVANTAGES

- \* delivers reliable measurements within a rapid two-to-five minute analysis period using a simple blood sample from a finger prick.
- \* provides a faster, simpler and easier method of monitoring toxic metal exposures in high-risk populations, such as industrial workers, children and people living in polluted areas.
- \* costs up to ten times less than other current state-of-the-art plasma, mass spectrometry systems.
- \* provides portability in a system the size of a small suitcase for field work, which is lacking in other comparable sensors.

## RELATED LINKS

- » **Direct detection of Pb in urine and Cd, Pb, Cu, and Ag in natural waters using electrochemical sensors immobilized with DMSA functionalized magnetic nanoparticles**

Yantasee W, Hongsirikarn K et al. The Analyst. 2008.

<http://www.rsc.org/Publishing/Journals/AN/article.asp?doi=b711199a>

- » **Reference article:**

Next Generation of Personal Exposure Biomonitoring

<http://www.ehponline.org/members/2007/10190/10190.html>

### Technology Portfolio(s)

- » Monitoring
- » Other
- » Chemical Sensors

### Potential Industry Applications

- » Healthcare, Pharma, Biotech & Medical
- » Public Administration & Government

---

**Bruce J. Harrer**  
Pacific Northwest National Laboratory  
(509) 375-6958  
bruce.harrer@pnnl.gov  
<http://availabletechnologies.pnnl.gov>



Proudly Operated by **Battelle** Since 1965