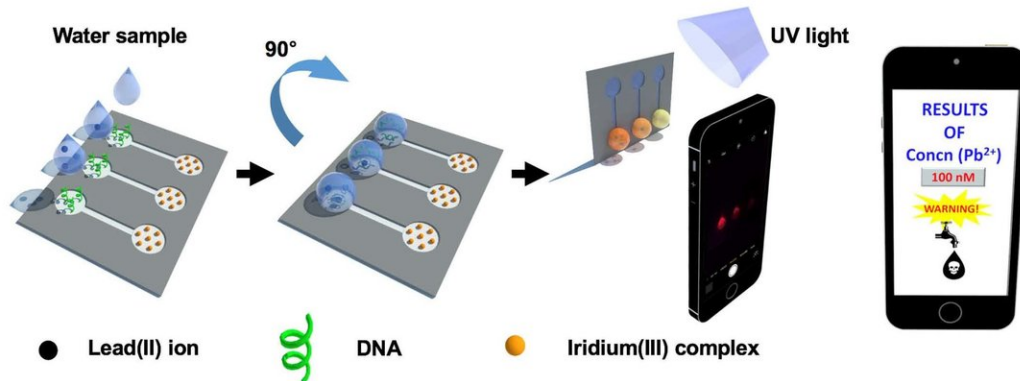


New device for quick and accurate detection of lead

May 16 2018



Whole detection process 操作流程

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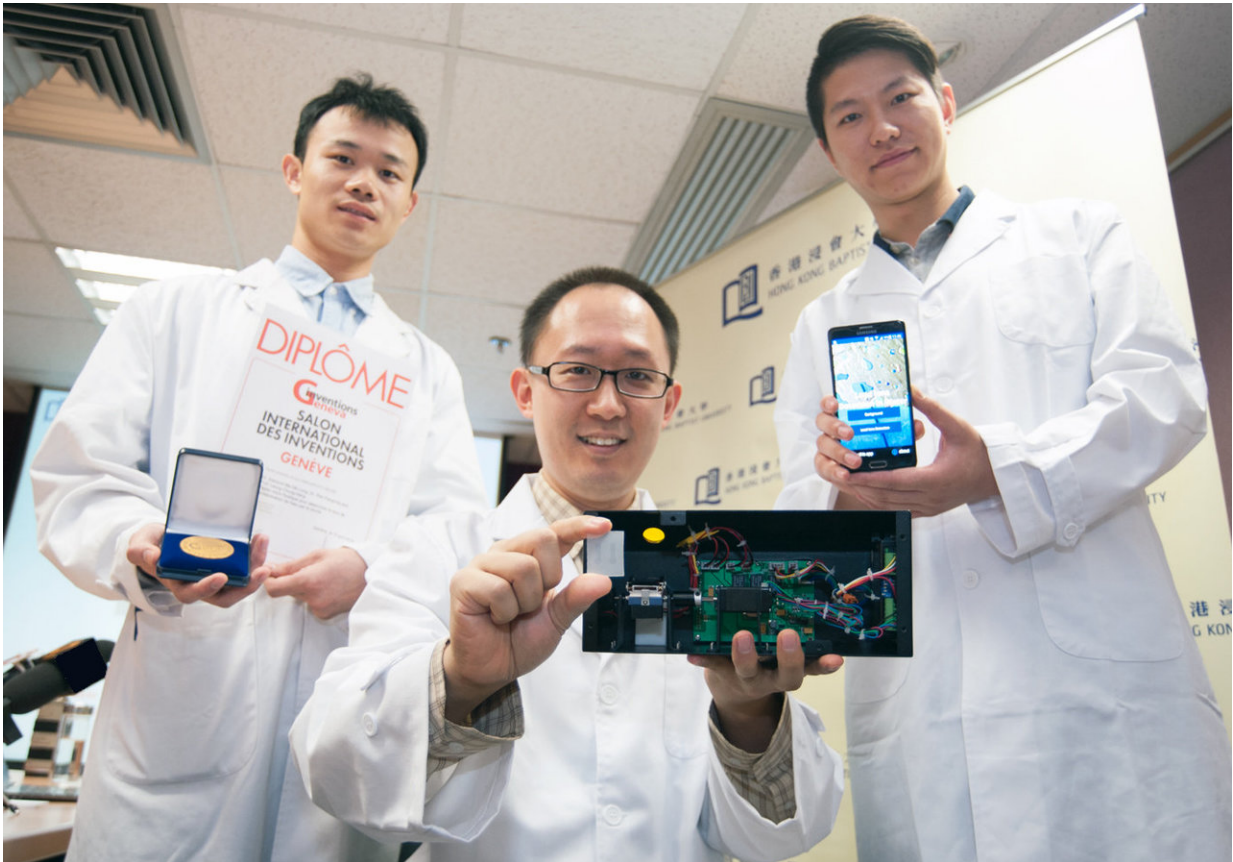
The diagram shows the detection process. Credit: HKBU

A research team from the Department of Chemistry of Hong Kong Baptist University (HKBU) has invented a portable device for one-stop

detection of lead concentration in drinking water. The DNA-based device, which works together with a smartphone, can accurately detect lead concentration in less than 10 minutes. Compared with traditional detection methods, it is much quicker, lower in cost, and highly accurate.

The team comprises Assistant Professor Dr. Ren Kangning and Associate Professor Dr. Edmond Ma of the Department of Chemistry of HKBU; Professor Leung Chung-hang of the Institute of Chinese Medical Sciences of University of Macau; postgraduate student of the HKBU's Department of Chemistry Sun Han and Research Assistant Mr Zhong Zezhi.

Currently, the only way for people to check if water is contaminated with lead is via remote laboratories equipped with detection technology. This method is expensive, and takes three to four days to get a result. The new method invented by the team enables users to check their drinking water without prior training. The user simply takes a drop from the sample, puts it on the test strip and slides it into the device, then checks the signal result (brightness) with a [smartphone app](#).



Dr. Ren Kangning (centre) and his team members: Ph.D. student Sun Han (right) and Research Assistant Zhong Zezhi (left). Dr. Ren is holding the portable device and a test strip. Credit: HKBU

Dr. Ren said, "Our [test strip](#) is a plastic microfluidic chip pre-loaded with reagents and probes, hence is simple to operate. The smartphone app compares the signal from the user's sample with that from the pre-loaded control sample. If the signal from the user's sample is dimmer than the control sample, the app will indicate that drinking water is safe. And, vice versa, if the signal is brighter, it will indicate that tap water is unsafe to drink.

Dr. Ren said, "Lead is a widely known toxic substance which, if ingested

in excess, could lead to child developmental delays, behaviour and learning problems, hearing problems and kidney damage. Lead contamination in water and soil from industrial and commercial activities such as mining, metallurgy, printing and dyeing, paint and electronics, can go undetected. Drinking water can become contaminated with lead when the water pipes containing lead corrode. Other sources of lead include brass or chrome-plated brass faucets, older fixtures and the solder that connects pipes. The conventional testing method involves technical laboratory procedures that take time and have a high sensitivity requirement, rendering it impractical for on-site testing. Our new invention overcomes these difficulties."

According to the World Health Organization, every year, a large number of people worldwide suffer from [lead contamination](#). In 2013, lead contamination caused as many as 140,000 deaths and 600,000 mental disabilities. In 2015, there were incidents of lead exceeding the safety standard in some [drinking water](#) pipelines in Hong Kong. Dr. Ma said the invention not only allows consumers to monitor the safety of [drinking water](#) by themselves, but can also be used for routine monitoring by industry after wastewater treatment, as well as groundwater and soil testing in agriculture.

Provided by Hong Kong Baptist University

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