Portable water-testing device binds and shines

Ordinarily, when drinking water is being tested for toxic heavy metals, samples of it have to be sent off to labs. And while there are portable testing systems, they do have some limitations. A new device, however, is claimed to work better – by copying a process that takes place within the human body.

When someone has been poisoned with heavy metals such as mercury, arsenic or lead, doctors will sometimes inject what is known as a chelating agent into their bloodstream. This chemical binds with the metal ions, rendering them inert, and marking them for excretion from the body.
Based out of Singapore's Nanyang Technological University, Assoc. Prof. Yong Ken-Tye and Prof. Tjin Swee Chuan applied that same principle to their prototype device.

It incorporates an optical fiber sensor, coated with a chelating agent. When a water sample is introduced, heavy metal ions present within that water will bind with the agent, shifting the spectrum of a laser that is shone through the fiber. A built-in microprocessor analyzes that change in spectrum, determining the type and concentration of metal that's causing it.

The procedure can be conducted in the field within about five minutes, and only requires a few drops of water. Additionally, the device is sensitive enough to detect lead at levels down to five parts per billion, and is capable of detecting a total of up to 24 types of metal – reportedly twice as many as other portable sensors.

The scientists also note that some other portable devices require a buffer solution to be mixed with the water before testing, or they incorporate color-changing test strips that are subject to the interpretation of individual users.
Waterply, a spinoff company, is now commercializing the technology. Along with its use in a handheld device, the sensing system may also be incorporated into municipal water treatment plants or even home water filtration systems.