DETECTING ARSENIC IN GROUNDWATER USING NANOSTRUCTURES

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ABSTRACT

The presence of Arsenic (As) in groundwater, even at low levels, is a significant public health problem -- especially in economically undeveloped regions. However, methods for detecting this toxin in groundwater are problematic because they are not sensitive enough to detect low levels of As, not conducive to fast in-field detection, and/or cost-prohibitive (particularly for poor regions).

To address this international problem, researchers at UC Berkeley have developed an improved method for detecting As in groundwater as low as 1.8 parts per billion. This new sensor method is based on surface-enhanced Raman spectroscopy (SERS), in which analyte molecules near nanostructured metallic surfaces exhibit huge enhancements in Raman scattering. The Berkeley approach is a refinement of this SERS technology. Whereas previous attempts to use SERS to detect As have reported low sensitivities and poor signal-to-noise rations, this novel SERS-based approach achieved toxin detection levels of parts per billion.

In addition to being highly sensitive, this innovative approach is portable, disposable, easily prepared and readily can be used for in-field applications. The sensor also has the unique ability to distinguish between the As(V) and As(III) ionic species.

APPLICATIONS

Detecting Arsenic in groundwater.

ADVANTAGES

High sensitivity

Portable

Disposable

Easily prepared

Readily used in-field

Distinguishes between As(V) and As(III) species

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,057,705	06/16/2015	2007-090

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sensing

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