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**Microsensors for Ultrasensitive Detection of
Hexavalent Chromium in Groundwater**

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Abstract

We have conducted preliminary studies on the detection of hexavalent chromium in ground water using microcantilevers modified with self-assembled monolayers of triethyl-12-mercaptododecylammonium bromide. The self-assembled monolayer was prepared on a silicon microcantilever coated with a thin layer of gold on one side. The microcantilever undergoes bending due to sorption of CrO_4^{2-} ions on the monolayer-modified surface. These studies demonstrated the detection of hexavalent chromium with a sensitivity of 52 nanograms per liter under laboratory conditions.

Under the newly-funded project, we plan to develop in-situ, portable sensors for continuous monitoring of hexavalent chromium in groundwater using adsorption-induced stress on micromachined microcantilevers. The proposed project will be accomplished in two phases. In Phase I, techniques will be developed to optimize cantilever response to hexavalent chromium ions and to minimize the overall response of the detector to interferences such as other chemicals and variations in ambient temperature, pressure, vibration, etc. In Phase II, field portable sensors will be developed and demonstrated.