

Reagentless Field-Usable Fixed-Site and Portable Analyzer For Trihalomethane (THM) Concentrations in Drinking Water EPA Phase I, II SBIR, Contract No. EP-D-10-060

Need: In this SBIR project, KWJ Engineering developed a tiny low cost planar sensor chip with a rare-earth sensory coating on it and demonstrated that it is responsive to THMs at low ppb levels. The resulting sensor was placed in an analyzer to make analytical quality monitoring of our drinking water for TTHMs possible virtually anywhere, anytime, on-the-spot, and at low cost. Additional applications to be studied as potential commercial markets include pool and spa monitoring, as well as industrial water and groundwater.

Approach/Results: In Phase I, KWJ fabricated and tested a planar version of the low cost sensor, demonstrating the ability to detect <5ppbv CHCl₃, and <15ppbv CHBr₃ in gas phase, and <10 and 20ug/L, respectively, in water and without pre-concentration. This sensor, therefore, can meet the EPA requirement for sensitivity.



The objective of Phase II was to develop the instrumentation to demonstrate the sensor's capability and two methods using the RCI sensor-based instrumentation: 1] screening method to determine < 80 uG/L TTHM in a drinking water sample, and 2] if detected at 80uG/L or other specified threshold, a sensor array measurement will be used to provide quantitative speciation of the THMs present. It would be a significant advance in the state of the art to be able to sense the halomethanes and, if present, tell which ones are present, in a relatively simple, low-cost instrument that is suitable for both field portability and in-line process control measurements



Benefits/Innovation: KWJ discussed the potential of such a low cost THM monitor with several potential partners and customers. Hach Company indicated that there is a market for real-time, inline monitors not only for THMs, but also HAA5 suite of halogenated byproducts found in drinking water. Several sites would be interested in evaluation of functional prototypes with stable sensors and quantified MDL, accuracy, error data. Discussions with the Las Vegas Valley Water District indicates that the potential market for easy to use, inline THM analyzers could be very large. Additional applications, since the price is significantly lower than GC-based systems, would be in wastewater monitoring and landfill assessment. Partners to commercialize are sought.

